

Original Article

A Practical Tool to Identify Patients Who May Benefit from a Palliative Approach: The CARING Criteria

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Abstract

Palliative care is often offered only late in the course of disease after curative measures have been exhausted. To provide timelier symptom management, advance care planning, and spiritual support, we propose a simple set of prognostic criteria that identifies persons near the end of life. In this retrospective cohort study of five prognostic indicators, the CARING criteria (Cancer, Admissions ≥ 2 , Residence in a nursing home, Intensive care unit admit with multiorgan failure, ≥ 2 Noncancer hospice Guidelines), logistic regression modeling demonstrated high sensitivity and specificity for mortality at 1 year (c statistic > 0.8). A simple set of clinically relevant criteria applied at the time of hospital admission can identify seriously ill persons who have a high likelihood of death in 1 year and, therefore, may benefit the most from incorporating palliative measures into the plan of care. J Pain Symptom Manage 2006;31:285–292. © 2006 U.S. Cancer Pain Relief Committee. Published by Elsevier Inc. All rights reserved.

Key Words

Prognosis, palliative care, mortality

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Introduction

Inadequate symptom management, failure to address or adhere to advance directives, and unplanned institutional deaths are identified problems in care for the dying.^{1–3} While approximately 25% of persons in the United States die receiving hospice care, all too often hospice services are not initiated until days or even hours before death.² Rather than a more integrated approach combining palliative with life-prolonging therapy for persons with serious, advanced illness, current medical care often follows a segregated pattern of cure-focused

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care followed by palliative care only when cure is no longer possible.⁴

One barrier to initiating palliative care is the constraint inherent in the practice of medicine, where advance care planning discussions are difficult due to time and billing limitations in the outpatient setting. Hospitalization is an ideal opportunity to start addressing palliative care needs. During hospitalization, the patient is a captive audience and exacerbation of an illness may promote self-reflection, allowing the patient to be more open to planning for the future.

Perhaps an even more important barrier to initiating palliative care, and initiating it earlier in the disease process, is the failure to identify those persons who may have a limited life expectancy. A good prognostic tool would allow health care providers to target palliative care interventions to those who stand to benefit the most, persons with a poor life expectancy. While it is possible to use one of the available prognostic tools,⁵ these tools often require detailed physiologic or diagnostic information and are not readily applied in the clinical setting.⁶⁻⁸ In addition, many prognostic tools only focus on a critically ill population rather than the majority of hospitalized patients admitted to the general medical wards.⁸⁻¹¹ Several recent prognostic tools have focused on hospitalized elderly populations and mortality *following* hospital discharge.¹² However, applying a prognostic tool after hospitalization would not use this unique opportunity to intervene.¹³

Our approach was to develop a simple set of prognostic criteria to be used as a screening tool at a sentinel point, hospital *admission*, for identifying patients who might benefit from a palliative approach. This study describes the validation of a set of five indicators, the CARING criteria (Cancer, Admissions ≥ 2 , Residence in a nursing home, Intensive care unit [ICU] admission with multiorgan failure [MOF], ≥ 2 Noncancer hospice Guidelines).¹⁴ These criteria, using information readily available at the time of hospital admission, could be applied to identify patients for more directed discussions about goals of care, advance care planning, and symptom management, discussions that are difficult in the time-limited outpatient setting.

Methods

This retrospective chart review was approved by the Colorado Multiple Institutional Review Board and the Denver Veterans' Administration Institutional Review Board. Its purpose was to validate a set of prognostic criteria applied at the time of hospital admission as a screening tool to identify those patients with limited life expectancy who may benefit from integrating palliative measures into their care planning. All patients admitted to the general medical wards or medical ICU of the Denver Veterans' Administration Medical Center (DVAMC) during the time period of February 1 through June 23, 1999 comprised the study population ($n = 895$). There were no exclusion criteria. The DVAMC is a large urban Veteran's Administration (VA) medical center affiliated with the University of Colorado at Denver and Health Sciences Center Internal Medicine residency program. In addition to caring for veterans in the Denver metro area, the DVAMC serves as a tertiary referral center for veterans in rural Colorado, Wyoming, and parts of Montana. The median age of the patients was 65 years. Ninety-eight percent were men.

Measures

The clinical prognostic criteria, the CARING criteria, were developed by one of the authors (S.F.) with the intention of identifying seriously ill persons who would benefit from end-of-life discussions and aggressive symptom management. The initial purpose of the CARING criteria was to create a research tool to select patient records for a retrospective chart review that would provide a detailed study of aspects of advance care planning, symptom assessment and management, and other important facets of palliative care. The criteria are simple items that could be identified immediately from the patient and/or the medical record upon hospital admission. The criteria include items that are already part of the routine physician admission notes and do not require additional data collection or assessments. The CARING criteria were chosen a priori based on review of the prognostic literature (relating to hospice eligibility and mortality) and clinical experience. The criteria include:

- C Primary diagnosis of Cancer
- A ≥ 2 Admissions to the hospital for a chronic illness within the last year
- R Resident in a nursing home
- I ICU admission with MOF
- N Noncancer hospice (meeting ≥ 2 of the National Hospice and Palliative Care Organization's (NHPCO)
- G Guidelines)

Date of birth was collected to determine age. Mortality at one year following the index hospitalization was the primary end point.

Data Collection

The DVAMC uses an electronic medical record, the Computerized Patient Record System (CPRS). Admission logs, collected by the Department of Medicine at the DVAMC, were used to identify names of all persons admitted to the medicine service of the hospital during the study period. Electronic medical records were retrospectively reviewed using the date of the index hospitalization as the reference point for identifying those persons meeting any one of the CARING criteria. Only information available at the time of admission for the index hospitalization was used to classify someone as having met any of the criteria. Data from a diagnostic test were not considered as supportive evidence if completed subsequent to the index hospitalization admission date.

The initial determinant of mortality status was the CPRS automated prompt that contains the date of death. Records that did not contain a date of death were then reviewed to determine if a follow-up appointment had occurred beyond the one-year end point, thus ensuring that the patient was living. Several approaches were used to determine mortality status for those patients without a date of death or confirmed follow-up visit. VA facilities outside the Denver area were contacted for the follow-up and mortality status of patients referred from another VA. Calls were also made to long-term care facilities and patients' homes. Ultimately, 2% of the study population ($n = 22$) remained lost to follow-up.

The data were recorded on paper chart review forms and then entered into a Microsoft Access[®] database. Initial pilot testing of 30 patients' records for the CARING criteria, conducted by S.F. and W.G., demonstrated a κ

for interreviewer reliability of 1.0. As all study records were reviewed solely by the author (S.F.), who was not blinded to the mortality outcome, reliability was evaluated by randomly selecting 10% of the study charts for blind re-review. This process demonstrated 100% test-retest reliability for the study cohort.

Statistical Analysis

All analyses were conducted using the statistical application software SAS[®] for Windows, version 8.02, from the SAS Institute, Cary, NC. *t*-Tests were used to compare the age of those lost to follow-up and the rest of the sample. Chi-squared (χ^2) tests were used for categorical variables to compare those lost to follow-up and the rest of the sample. Chi-squared tests were also used to analyze associations between the predictive criteria and the primary outcome, death in ≤ 1 year. A *P* value < 0.25 was considered significant to include the variable in the adjusted analyses.¹⁵ A logistic regression model was fit using each of the CARING criteria and age. Gender was not included as 98% of the cohort were men. The data were then split into two sets, a model-building set (subjects admitted the first 2 months of the study period, $n = 435$) and a validation set (subjects admitted the second 2 months of the study period, $n = 438$). Cross-validation was conducted to validate the final logistic regression model by selecting a mortality probability to achieve high sensitivity without sacrificing specificity.^{16,17} The error rate of the validation set was compared to that of the model-building set. Kaplan-Maier survival analysis was conducted to compare those subjects who met ≥ 1 of the CARING criteria with those who did not. Finally, we developed a scoring rule that would categorize individuals as high, medium, or low risk for 1 year mortality at the time of hospital admission. Values were assigned to each of the CARING variables and the four age quartiles were based on the probabilities of death from the final regression model.

Results

Eight hundred and ninety-five patients were admitted to the medical service during the study period. We were unable to determine date of death or confirm a follow-up appointment after

one year of index hospitalization for 2% of the sample ($n = 22$). There were no significant differences in age, ethnicity, or CARING criteria between those subjects lost to follow-up and those whose status we were able to confirm. Excluding the 22 persons lost to follow-up, the effective sample size is 873. Sample characteristics of the study cohort are depicted in Table 1.

Forty-nine percent ($n = 427$) met ≥ 1 of the CARING criteria and 26% ($n = 229$) died within 1 year of the index hospitalization. Each individual CARING criterion had significant associations with one-year mortality ($P < 0.001$); therefore, all variables demonstrated adequate statistical significance to enter the logistic regression model. Each individual CARING criterion and age were significant independent predictors of one-year mortality, with the exception of residence in a nursing home (Table 2). The c statistic for the regression model was 0.82. For the cross-validation procedure, the probability was set at 0.175, yielding a sensitivity of 79% and specificity of 75%. The model-building set yielded an error rate of 0.16. Using the beta coefficients from the model-building set, the second half of the sample, the validation set, yielded an error rate of 0.26. Survival was significantly lower for those who met ≥ 1 of the CARING criteria compared with those who did not meet any of the CARING criteria (Fig. 1).

A scoring rule was developed based on low, medium, and high probability for death at one year. To predict a high probability of one-year mortality, sensitivity was set at 57% and

Table 2
Prediction of One-Year Mortality
Using the CARING Criteria

	Odds ratio (CI)
Cancer as a primary diagnosis	7.50 (5.05–11.11)
Admissions (≥ 2) to the hospital in the past year for a chronic illness	1.62 (1.12–2.35)
Resident in a nursing home	2.00 (0.84–4.73)
ICU MOF	5.85 (1.80–19.04)
Noncancer hospice guidelines (≥ 2 NHPCO criteria)	10.03 (5.68–17.07)
Age ^a	1.18 (1.01–2.35)

CI = 95% confidence interval.

^aAge was divided into quartiles: <55 years, 55–65 years, 66–75 years, and >75 years.

specificity was set at 86%. The beta coefficients for the regression model were converted to the following scores for each of the CARING criteria: cancer, 10 points; admissions (≥ 2) to the hospital, 3 points; residence in a nursing home, 3 points; ICU with MOF, 10 points; and noncancer hospice guidelines, 12 points. Age divided into quartiles and points were assigned as follows: <55 years, 0 points; 55–65 years, 1 point; 66–75 years, 2 points; and >75 years, 3 points; with increasing age conferring increasing risk of death. The scoring system is illustrated in a matrix that can be used for quick identification of the risk for one-year mortality (Table 3).

Discussion

This study found that a simple set of criteria that are easily identified at the time of hospital admission were highly predictive of death at one year in a hospitalized veteran population.

Table 1
Study Cohort Characteristics

Study cohort ($n = 873$)	
Age (mean \pm SD) (years)	63 \pm 13
Male gender	98%
Ethnicity	
African American	13%
Caucasian	69%
Latino	8%
Other	10%
CARING criteria	
Cancer	23%
Admissions to the hospital ≥ 2 in the past year	36%
Resident in a nursing home	3%
ICU with MOF	2%
NHPCO (≥ 2) noncancer guidelines	8%

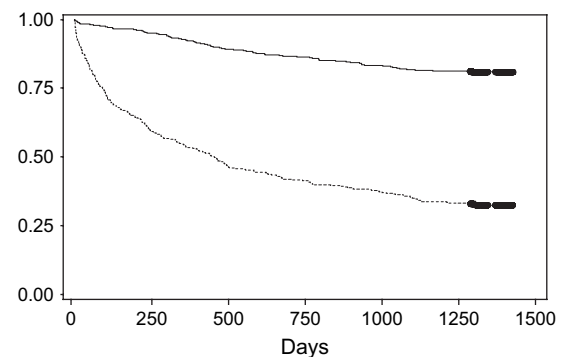


Fig. 1. Survival plot for those subjects who did and did not meet the CARING criteria. ···· Subjects meeting no CARING criteria. — Subjects meeting ≥ 1 CARING criteria.

Table 3
Score of Risk of Death for the CARING Criteria by Age Group

CARING Criteria Components		None	Resident in a nursing home	Admitted to the hospital ≥ 2 times in the past year	Resident in a nursing home and multiple hospital Admissions	Primary diagnosis of Cancer	ICU admission with MOF	Non-cancer Hospice Guidelines	All other combinations of CARING criteria
Age in years	< 55	0	3	3	6	10	10	12	≥ 13
	55-65	1	4	4	7	11	11	13	≥ 13
	66-75	2	5	5	8	12	12	14	≥ 13
	>75 years	3	6	6	9	13	13	15	≥ 13
Risk									
Low		≤ 4	(probability < 0.175)						
Medium		5-12	(probability 0.175-0.48)						
High		≥ 13	(probability ≥ 0.49)						

The bolded OR are statistically significant as evidenced by the confidence intervals that do not cross 1.0.

The CARING criteria demonstrated the degree of sensitivity and specificity (79% and 75%) required of a screening tool. For any screening tool, it is important to consider the potential for harm if either the number of false negatives (low sensitivity) or false positives (low specificity) is elevated. In the case of using the CARING criteria as a screening tool, there is no potential for harm in treating false positives (i.e., having palliative care needs addressed) if in fact the patient has a better prognosis than predicted. Ideally, all persons would have a completed advance directive and no one would experience untreated pain. However, using a scoring rule can help to ensure that the palliative care resources are prioritized for patients who stand to benefit the most from palliative care, those with a limited life expectancy.

Meeting ≥ 2 of the NHPCO noncancer hospice guidelines demonstrated the highest risk

of 1 year mortality following index hospitalization. Previous studies of the predictive value of the NHPCO guidelines have demonstrated variable results.^{8,9,18-20} However, our study also included an index hospitalization, which may serve as an additional indicator of high acuity.

A primary diagnosis of cancer was also highly predictive of death at one year. This finding has high face validity as most of the patients admitted for cancer had metastatic disease. Moreover, cancer generally follows a more predictable course of disease progression than chronic medical illnesses, such as congestive heart failure, cirrhosis, or chronic obstructive pulmonary disease.⁸

Admission to the ICU with MOF appeared to be a strong predictor as well, although the wide confidence intervals reflect the small sample size for persons meeting this criterion. Despite the small number of patients meeting this criterion in our sample, this predictor is

critical given the high prevalence of ethics consultations to facilitate discussions relating to futility and goals of care for patients in the ICU.²¹ A proactive palliative approach has been advocated by experts in the field and has even been shown to decrease length of stay in the ICU and reduce the number of days for transitioning a patient from aggressive life-sustaining care to comfort care.²²⁻²⁴ Use of the CARING criteria to identify patients suitable for a palliative approach will serve the goal to increase palliative care in the ICU.

The "A" of the CARING criteria, ≥ 2 hospital admission in the past year for a chronic illness is, statistically, one of the weaker predictors for one-year mortality, with the lowest specificity of any of the criteria. However, one of the most important strengths of this criterion is that it is broadly applicable to many patients admitted to the hospital. A patient can be identified as meeting the criteria with one simple question—"Have you been admitted to the hospital in the past year for your (medical condition)?" Chronic illness and functional decline characterize the last years of life for most Americans and failure to identify a poor prognosis delays opportunities to address symptom management, advance care planning, or discussions about goals of care. The broad, disease non-specific "A" of the CARING criteria captures those patients whose chronic illness is serious enough to result in repeated hospitalizations.

Residence in a nursing home prior to hospitalization was not a statistically significant predictor of mortality within one year, most likely due to inadequate power secondary to the small number of persons meeting this criterion. However, we believe that it was critical to keep nursing home residence in the model for several reasons. First, it serves as a surrogate for poor functional status, which is a clear and consistent predictor of increased mortality risk.^{7,25,26} As this study was a retrospective chart review, detailed functional assessments of the patients were unavailable and physicians do not routinely assess or document this information. In fact, functional assessments were documented for $<20\%$ ($n = 38$) of the patients meeting at least one of the CARING criteria.²⁷ Furthermore, for these vulnerable persons, a palliative approach to care is critical as the burden of untreated pain and unaddressed advance care planning is staggering while access

to palliative care or hospice in nursing homes is too often limited. By identifying nursing home residents as a target population through the CARING criteria, a unique opportunity to address palliative needs will not be missed.

A limitation of this study is its generalizability. The veteran population is unique; results of this study cannot be applied in more diverse, hospitalized populations without further validation of the CARING criteria. A second limitation of this study is the difficulty inherent in prognostic and diagnostic works, that no tool is 100% sensitive and specific. For patients and families, an approximation of survival can allow planning for the future but may ultimately lead to frustration due to inevitable inaccuracies in estimation. Even the most accurate prognostic models have been shown to overestimate survival a week or even days before death.²⁰

The CARING criteria have two important applications as a screening tool. First, this simple, mnemonic acronym can be used as a clinical tool for health care providers to rapidly identify patients with a limited life expectancy who stand to benefit the most from a palliative approach. Care for patients at the end of life has traditionally followed a model of intense curative care with an abrupt shift to comfort care at the end of life. Palliative care advocates have argued for a more integrated model with a gradual transition from curative to comfort-directed treatment.⁴ An important barrier to introducing palliative measures earlier in the disease process is the failure to recognize persons with chronic illness who are at high risk for death. A hospitalization may be a unique opportunity to initiate discussions about goals of care and symptom management, as time pressures often prohibit detailed advance care planning in the outpatient setting.²⁸ Furthermore, because 75% of Medicare beneficiaries experience a hospitalization within the year prior to death,²⁹ the hospital may be the optimal place to initiate or continue these discussions. Therefore, if a patient meets one or more of the CARING criteria, we advocate for a detailed symptom assessment with a plan to manage bothersome symptoms. In addition, patient values and goals of care should be defined and the current plan of care should be reviewed to ensure that it reflects those goals. More specific advance care

planning should be completed if the patient desires but at the very least, a proxy decision maker should be established and included in the values and goals discussions.

The second application of the CARING criteria is in research and quality improvement initiatives. The inclusion of an index hospitalization in conjunction with these criteria provides a well-defined point at which seriously ill patients for research purposes are identified. The CARING criteria are an important tool for identifying appropriate patient populations for research aimed at addressing barriers to pain, symptom management, goals discussions, and advance care planning.

A concurrent survey of the initial study cohort's medical records demonstrated poor documentation of symptom assessment and management as well as rare discussion regarding prognosis, goals of care, or advance care planning.²⁷ Given this, and the demonstrated predictive value of the CARING criteria, a logical next step is to address the question of whether incorporating the CARING criteria into routine patient assessment accompanied by protocols for palliative interventions can impact the care of persons experiencing serious illness. For many patients, considerable suffering occurs in the last days to months of life in the context of frequent hospitalizations and extensive medical utilization.^{1,30} Identifying appropriate patients, addressing palliative care issues earlier in the course of illness, and initiating an ongoing dialogue may be the first critical step in preparing persons for the end of life and integrating palliative care with curative treatment.

Conclusion

The CARING criteria represent a simple set of easily obtained items that were found to be highly predictive of death at one year in a seriously ill, hospitalized, veteran population. Using the CARING criteria as a practical screening tool to identify patients for whom palliative care needs should be addressed is a first step towards overcoming one of the major barriers to providing better care in the last year of life. Whether these criteria will be equally predictive in other hospitalized populations awaits further study.

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