Original Article

Prognostication Based on the Change in the Palliative Prognostic Index for Patients With Terminal Cancer

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Abstract

Context. The use of the Palliative Prognostic Index (PPI) in relation to the clinical time course has not yet been established.

Objectives. To investigate the association between the changes in the PPI over time and the survival of terminal cancer patients in a palliative care unit (PCU).

Methods. This retrospective cohort study analyzed data from 374 terminal cancer patients who were admitted to the PCU of a university hospital in Japan. Clinical data, such as age, gender, body mass index, vital signs, initial PPI, and subsequent PPI, were collected from the medical records. The PPI change per day (ΔPPI) was calculated using the initial PPI at admission and the one after five to seven days. The factors associated with death within three weeks were identified using Cox proportional hazards model analysis.

Results. After their admission to the PCU, 147 (39.3%) patients were deceased within three weeks. The multivariate-adjusted analysis showed that body temperature (hazard ratio [HR] 0.7; 95% CI 0.5, 1.0), initial PPI (HR 1.3; 95% CI 1.2, 1.4), and ΔPPI (HR 6.6; 95% CI 4.9, 9.0) were significantly and independently associated with death within three weeks. In the subanalysis, the ΔPPI was significantly associated with death within three weeks in the group with initial PPI ≤ 4 (HR 9.3; 95% CI 5.8, 15.0), $4 <$ initial PPI ≤ 6 (HR 14.4; 95% CI 5.7, 36.2), and initial PPI > 6 (HR 9.0; 95% CI 4.1, 20.0).

Conclusion. Our data suggest that the ΔPPI may be useful for predicting the survival of terminally ill cancer patients. J Pain Symptom Manage 2014;47:742–747.

Key Words

Palliative Prognostic Index, PPI, illness trajectory, prognostication, palliative care

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Introduction

"How long do I have?" is a question often raised by patients receiving palliative care for cancer.[1] A study by Kirk et al.[2] has found that the prognosis and hope are the most important aspects conveyed in patient and family communications. Accurate prognostic information can allow terminal cancer patients adequate time to prepare for their impending death. Prognostic information is also important for medical staff. Realistic survival estimates can inform decisions about the appropriateness of medical interventions and the timing of referral to palliative care services.[3] However, clinicians' predictions of survival are often inaccurate and overly optimistic.[4,5] Therefore, more accurate prognostic tools are needed.

The illness trajectories, expressed by the activities of daily living (ADLs) and projected survival time, are different for each illness. It is known that the trajectory of incurable cancer shows a short period of evident decline.[6] Prognostic tools, therefore, have been investigated since Evans and McCarthy[7] reported in 1985 that the Karnofsky Performance Status Scale, which estimates ADLs, was more useful as a prognostic tool than clinicians' survival predictions.

The Palliative Performance Scale (PPS), a modification of the Karnofsky Performance Status Scale, measures the physical status of patients in palliative care.[8] The Palliative Prognostic Index (PPI), developed and successfully validated in hospice inpatients with advanced malignant disease by Morita et al.,[9] is based on the PPS, with four additional variables of prognostic significance (Table 1). According to the original paper by Morita et al.,[9] a PPI of greater than six predicts a survival of less than three weeks with a sensitivity of 80%, a specificity of 85%, and an overall accuracy of 80%. A PPI of greater than four predicts a survival of less than six weeks with a sensitivity of 80%, a specificity of 77%, and an overall accuracy of 79%.[9] Using the PPI improved the accuracy of physicians' survival predictions.[10] The PPI was subsequently validated in different settings in Australia and Ireland.[11,12]

The PPI is usually assessed only once, generally at the consultation with the palliative care specialist and/or on admission to the palliative care unit (PCU). This assessment does not include the impact of the passage of time or other prognostic indicators. However, based on the concept of illness trajectory, the ability to complete ADLs worsens in association with disease progression in cases of incurable cancer. This means that the PPI can change depending on the condition of the patient throughout the natural course of the disease. Therefore, we hypothesized that deterioration of the PPI over time is associated with survival. We herein assessed whether the changes in the PPI over time correlate with patient survival, with adjustments for confounders and candidate prognostic indicators, such as vital signs.

Table 1
The Palliative Prognostic Index

Variables	Partial Score
Palliative Performance Scale	
10–20	4
30–50	2.5
≥60	0
Oral intake	
Mouthful or less	2.5
Reduced but more than mouthful	1
Normal	0
Dyspnea at rest	
Present	3.5
Absent	0
Delirium	
Present	4
Absent	0
Edema	
Present	1
Absent	0

Methods

This retrospective cohort study included all patients whose first admission was longer than five days in a PCU of Jichi Medical University Hospital in Japan between May 1, 2007 and July 31, 2010. No patients received radical antineoplastic therapy, such as surgery, chemotherapy, or radiation, as curative therapy during admission. Some patients received radiation for pain relief. The study was approved by the ethics and medical research committees at Jichi Medical University (Approval No. A10-51).

We collected consecutive data from these terminal cancer patients from the electronic medical records, including gender, age, and body mass index on admission to the PCU. Elsayem et al.[13] found vital signs to be candidate prognostic factors in PCUs. Therefore, vital