

Declan Walsh
Fadi Mahmoud
Barbara Barna

Assessment of nutritional status and prognosis in advanced cancer: interleukin-6, C-reactive protein, and the prognostic and inflammatory nutritional index

Published online: 21 August 2002
© Springer-Verlag 2002

The Harry R Horvitz Center for Palliative Medicine is a World Health Organization Demonstration Project in Palliative Medicine

D. Walsh (✉) · F. Mahmoud
The Harry R Horvitz Center
for Palliative Medicine,
The Cleveland Clinic Taussig Cancer Center,
Cleveland, Ohio, USA
e-mail: walsht@ccf.org
Tel.: +1-216-4447793
Fax: +1-216-4455090

D. Walsh
Cleveland Clinic Foundation – M76,
9500 Euclid Ave., Cleveland, Ohio 44195,
USA
(<http://www.clevelandclinic.org/palliative>)

B. Barna
Rammel Kamp Center for Education
and Research, Metrohealth Medical Center,
Cleveland, Ohio, USA

Abstract The Prognostic Inflammatory Nutritional Index (PINI) is a simple scoring system that has been used to evaluate nutritional status and prognosis in critically ill patients. The PINI has never been evaluated in advanced cancer. Fifty consecutive patients with advanced cancer, weight loss, and anorexia were studied. C-reactive protein (CRP), albumin, pre-albumin, interleukin-6 (IL-6), and alpha 1-acid glycoprotein (AAG) were evaluated. The individual values for AAG, CRP, and IL-6 were markedly elevated. In contrast to albumin and prealbumin, CRP levels were very high. The PINI was significantly elevated, and higher than reported in critically ill intensive care patients. Elevated IL-6 levels correlated with high PINI and CRP values. CRP, IL-6, and PINI should be considered in future re-

search on nutritional status and prediction of prognosis in advanced cancer.

Keywords Cytokines · Nutrition · C-reactive protein · Prognosis

The incidence and mortality of cancer are increasing. The anorexia-cachexia syndrome (ACS) affects up to 80% of cancer patients and is the leading cause of death in advanced cancer [1, 2, 3]. One of the concerns in palliative medicine research has always been to determine precisely what outcome can or must be expected, which is a major factor to be considered in deciding whether active intervention or palliation is appropriate in patients with advanced cancer [4]. Several prognostic factors are now in use. The Prognostic Inflammatory Nutritional Index (PINI= [alpha 1-acid glycoprotein (AAG) × C-reactive protein (CRP)] divided by [albumin × prealbumin]) is a simple clinical assessment tool which aggregates two blood markers of inflammation (CRP and AAG) with

two of nutrition (albumin and prealbumin) into a single score. This scoring system may predict morbidity or mortality in hospitalized patients [5]. PINI has been found to be a reliable indicator of both nutritional status and prognosis in trauma, burns, and infection. However, it has never been evaluated in cancer [5, 6, 7]. Scores range from 0.47 in healthy adults to 236 in those who have had infections and subsequently died. The prognostic value of the score is as follows: >30 = life risk, 21–30 = high risk, 11–20 = medium risk, 1–10 = low risk and <1 = minimal risk; normal, healthy individual [6].

We conducted the first prospective consecutive pilot study [8] to evaluate the PINI in persons with advanced cancer. Fifty consecutive patients participated: 28 wom-