Is the B12/CRP Index More Accurate Than You at Predicting Life Expectancy in Advanced Cancer Patients?

To the Editor:

The benefits of accurate prognostic information, as well as the limits of physicians’ ability at estimating survival in advanced cancer patients, are largely recognized.1,2 The serum vitamin B12/C-reactive protein (CRP) Index (BCI) is one of a number of validated prognostic tools that attempt to improve clinicians’ predictions (CPS). Neither the original study by Geissbühler et al.3 nor the validation assessment by Kelly et al.4 analyzed the added value of the BCI in terms of CPS.

We recently compared the accuracies of BCI and CPS for the prediction of 90-day mortality in nonhematological cancer patients who were seen at initial consultation by our hospital-based palliative care consultation service at Hospital de Santa Maria, a metropolitan tertiary and general hospital in Lisbon, Portugal. Over six months, we recruited all patients with locally advanced or metastatic cancer referred to our service who had had blood assays taken.
the day of entry into the study as part of their routine clinical care. Adult patients who consented to participate were excluded if they were receiving or had received vitamin B12 within the previous year or if they had known disease of the terminal ileum or pernicious anemia. At initial consultation, CPS was determined by the specialist palliative care physician. Survival and initial BCI information (B12 [pmol/L] × CRP [mg/L]) were collected 15 months after the study end.

Three of the 65 prospectively followed patients were excluded (two refused the program and data were incomplete in another). Sixty-two (57% male) patients were included in the final analysis. Median age was 71 years, 47% had a digestive tract cancer, 53% had documented liver metastasis, and 39% were still undergoing disease-modifying treatments. The median actual survival was 44 days (95% confidence interval [CI]: 27–61). Patients were divided into three groups according to the BCI scores: 17/62 patients (27%) had a BCI score in the best prognostic category (BCI ≤ 10,000; Group 1), 13/62 patients (21%) had a BCI score in the intermediate range (BCI 10,001–40,000; Group 2), and 32/62 patients (52%) had a BCI score in the worst prognostic category (BCI > 40,000; Group 3). Kaplan-Meier survival analysis is pictured separately for the three scoring categories in Figure 1. The log-rank test for trend was statistically significant ($\chi^2 = 10.9$, $P = 0.001$). Patients with a BCI of > 40,000 (Group 3) had a significantly worse prognosis (median survival: 27 days [95% CI: 17–37]) than patients in Group 1 (median survival: 88 days [95% CI: 26–150]), but the differences between Group 3 and the intermediate prognostic group (median survival: 68 days [95% CI: 37–98]) failed to reach statistical significance. As in Kelly et al.’s study, the differences between the good and the intermediate prognostic groups also failed to be significant, making an intermediate or low score difficult to interpret.

CPS was correct to within one week in 26% of cases, correct to within two weeks in 42%, and beyond by more than four weeks in 27%. When incorrectly predicted, the survival was underestimated in 72% of cases. However, a positive correlation between CPS and survival was seen (Spearman rank correlation: $0.57$, $P < 0.001$). Significant negative weaker correlations also were found between BCI and both CPS and survival (Spearman rank correlation: 0.47 and 0.46, respectively). The predictive accuracy of CPS on 90-day mortality was slightly superior to that of BCI > 40,000 (0.79 vs. 0.76). Except for specificity, both methods performed quite similarly (Table 1).

In this first (to our knowledge) head-to-head comparison between CPS and BCI, we found no advantage of BCI over CPS at estimating 90-day survival. Despite a small cohort size, our results reaffirmed the previously described poor prognosis of an elevated BCI (>40,000) in advanced cancer patients.3,4

Filipa Tavares, MD
Unidade de Medicina Paliativa
Centro Hospitalar Lisboa Norte
EPE – Hospital de Santa Maria
Lisbon, Portugal
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References

| Table 1 |
| Accuracy for the Prediction of 90-Day Mortality Using BCI > 40,000 and CPS |
| Prognostic tools | Sensitivity | Specificity | Positive Predictive Value | Negative Predictive Value | Accuracy |
| BCI > 40,000 | 0.73 | 0.80 | 0.84 | 0.67 | 0.76 |
| CPS | 0.89 | 0.56 | 0.85 | 0.64 | 0.79 |