Development of Prognosis in Palliative care Study (PiPS) predictor models to improve prognostication in advanced cancer: prospective cohort study

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Abstract
Objective To develop a novel prognostic indicator for use in patients with advanced cancer that is significantly better than clinicians' estimates of survival.
Design Prospective multicentre observational cohort study.
Setting 18 palliative care services in the UK (including hospices, hospital support teams, and community teams).
Participants 1018 patients with locally advanced or metastatic cancer, no longer being treated for cancer, and recently referred to palliative care services.
Main outcome measures Performance of a composite model to predict whether patients were likely to survive for "days" (0-13 days), "weeks" (14-55 days), or "months+" (>55 days), compared with actual survival and clinicians' predictions.
Results On multivariate analysis, 11 core variables (pulse rate, general health status, mental test score, performance status, presence of anorexia, presence of any site of metastatic disease, presence of liver metastases, C reactive protein, white blood count, platelet count, and urea) independently predicted both two week and two month survival. Four variables had prognostic significance only for two week survival (dyspnoea, dysphagia, bone metastases, and alanine transaminase), and eight variables had prognostic significance only for two month survival (primary breast cancer, male genital cancer, tiredness, loss of weight, lymphocyte count, neutrophil count, alkaline phosphatase, and albumin). Separate prognostic models were created for patients without (PiPS-A) or with (PiPS-B) blood results. The area under the curve for all models varied between 0.79 and 0.86. Absolute agreement between actual survival and PiPS predictions was 57.3% (after correction for over-optimism). The median survival across the PiPS-A categories was 5, 33, and 92 days and survival across PiPS-B categories was 7, 32, and 100.5 days. All models performed as well as, or better than, clinicians' estimates of survival.
Conclusions In patients with advanced cancer no longer being treated, a combination of clinical and laboratory variables can reliably predict

two week and two month survival.

Comments:
Strengths/uniqueness:

- The PiPs prognostic tool has a temporal format to make it more clinically meaningful E.g. to enroll onto a palliative drug plan for prognosis of less than 6 months, hospice placement.
- It is also very educational in terms of using a variety of clinical parameters to Formulate the process of prognostication e.g. cognition, dysphagia etc.
- This tool has the benefit of 2 versions i.e. a version for patients without blood work And another version with blood work.
- It can also be used on mentally incompetent patients.

Weaknesses:

- Unfortunately, about 1000 of the original 7000 patients took part in the study.
- Using this tool at the bedside may not be very practical and probably requires an "app" to process the prognostic factors.
- Like most acturial tools, it is more useful at the group level and may not apply well at the individual level as clinical context can vary.
- The 2 week to 2 month survival interval can be somewhat long as patients could be more at the 3 week mark versus more at the 2 month mark. This affects the goals of care.

Relevance to Palliative Care:
Useful in educating health care professionals in prognostication and as an adjunct to clinician prediction survival.