Relationship between Eastern Cooperative Oncology Group performance status (ECOG-PS) and actigraphy-derived activity parameters in a heterogeneous group of advanced cancer patients

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INTRODUCTION

Performance status has been shown to be a reliable predictor of overall survival¹. However, discrepancies often occur between different assessors (as this is a subjective assessment)². Actigraphy may be a better, objective method for prognostication. The actigraphy-derived dichotomy index (I<O), a marker of the daily rest-activity rhythm, is a measure that compares the amount of activity at night-time (major sleep period) to activity in the daytime (major wake period)³. The I<O has been reported to be of prognostic value in the metastatic colorectal cancer population⁴. However, the association between the ECOG-PS and I<O has not been fully explored.

The objectives of the study were to assess the relationship between ECOG-PS scores and the I<O and other actigraphy-derived activity parameters such as r24, mean daytime activity, and mean 24-hour activity, and to compare ECOG-PS scores assessed by the palliative care physician and patients.

METHODS

50 patients with advanced cancer and an estimated prognosis of <1 year were recruited as part of a feasibility study. Patients and the palliative care physician independently assessed the patient's ECOG-PS at baseline and after 7 days. Participants were instructed to wear an Actiwatch Spectrum Plus® for seven consecutive 24-hour periods on their non-dominant arm, and to concurrently complete a sleep diary. Spearman's rank correlation coefficient was used to assess the associations between physician-assessed ECOG-PS scores and the actigraphy-derived parameters.

RESULTS

ECOG-PS assessments were completed in 49 patients. On Day 8, there was moderate agreement between the palliative care physician and the patient assessments of their ECOG-PS, with a Kendall's correlation of 0.70 ($p < 0.001$) and kappa value of 0.47 ($p < 0.001$) (95% CI 0.66, 0.28).

44 patients wore the Actiwatch for at least 72 hours. A moderate negative correlation was observed between physician-assessed ECOG-PS and the dichotomy index (I<O) ($r = -0.57$; $p < 0.0005$). A low negative correlation was observed with ECOG-PS and r24 ($r = -0.34$; $p = 0.026$), as well as, ECOG-PS and mean daytime activity ($r = -0.35$; $p = 0.021$). There was no correlation between physician-assessed ECOG-PS and mean 24-hour activity level ($r = -0.24$; $p = 0.115$).

CONCLUSION

Mean total activity counts derived from actigraphy do not correlate with ECOG-PS, and so would not be expected to be good prognostic indicators. However, the dichotomy index (I<O), r24 and mean day-time activity are correlated with ECOG-PS, and may be good (objective) prognostic indicators in patients with advanced cancer.

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