Prognostic evaluation in patients with advanced cancer in the last months of life: ESMO Clinical Practice Guideline

SUPPLEMENTARY MATERIAL

Supplementary Table S1. PaP prognostic model

	Partial score
Dyspnoea	
No	0
Yes	1
Anorexia	
No	0
Yes	1.5
Karnofsky PS	
≥30%	0
10%-20%	2.5
Clinician's estimate of survival (weeks)	
>12	0
11-12	2
7-10	2.5
5-6	4.5
3-4	6
1-2	8.5
Total white cell count (x10^9/l)	
≤8.5	0
8.6-11	0.5

>11	1.5
Lymphocyte (%)	
20%-40%	0
12%-19.9%	1
<12%	2.5
Risk groups	**Total score**
A (>70% probability of surviving 30 days)	0-5.5
B (30%-70% probability of surviving 30 days)	5.6-11.0
C (<30% probability of surviving 30 days)	>11

PaP, palliative prognostic; PS, performance status.

Adapted with permission from Maltoni et al.[1]

Supplementary Table S2. PiPS prognostic model regression equations

PiPS-A 2 week (14 day)
PiPS-A 2-week (14 day) model log odds: LO_{A14} = 3.82 + 1.273amts - 0.023pulse - 0.498$distant_{mets}$ - 0.538$mets_{liver}$ - 0.563ecog + 0.449$overall_{health}$ - 0.771anorexia + 0.519$mets_{bone}$ - 0.475dyspnoea - 0.54dysphagia
PiPS-A 2-week (14 day) model survival probability: $PiPS_{A14}$ = 1 / 1 + exp (-LO_{A14})
PiPS-A 2 month (56 day)
PiPS-A 2-month (56 day) model log odds: LO_{A56} = 0.471 + 0.851amts - 0.022pulse - 0.407$distant_{mets}$ - 0.596$mets_{liver}$ - 0.219ecog - 0.421anorexia + 0.549$overall_{health}$ + 0.617$primary_{breast}$ + 1.477mgo_{cancer} - 0.51$lost_{weight}$
PiPS-A 2-month (56 day) model survival probability: $PiPS_{A56}$ = 1 / 1 + exp (-LO_{A56})
PiPS-B 2 week (14 day)
PiPS-B 2-week (14 day) model log odds: LO_{B14} = 4.577 + 0.952amts - 0.017pulse - 0.835$distant_{mets}$ + 0.767$mets_{bone}$ - 0.678anorexia - 0.531ecog + 0.393$overall_{health}$ -0.061wbc + 0.003platelet - 0.058urea - 0.004alanine - 0.006creative
PiPS-B 2-week (14 day) model survival probability: $PiPS_{B14}$ = 1 / 1 + exp (-LO_{B14})
PiPS-B 2 month (56 day)
PiPS-B 2-month (56 day) model log odds:

LO_{B56} = -0.075 -0.013pulse - 0.042wbc + 0.001platelet - 0.031neutrophil + 0.163$lymphocyte_{10exp9}$ - 0.062urea - 0.001alkaline + 0.040albumin - 0.007creactive + 1.56mgo_{cancer} - 0.673fatigue +0.474$overall_{health}$
PiPS-B 2-month (56 day) model survival probability: $PiPS_{B56}$ = 1 / 1 + exp ($-LO_{B56}$)

Parameters	**Definitions and scoring**
alanine	ALT (U/l)
alkaline	Alkaline phosphatase (U/l)
amts	AMTS score (If ≤3 then = 0, if >3 then = 1)
anorexia	Anorexia (no = 0, yes = 1)
creactive	CRP (mg/l)
$distant_{mets}$	Presence of distant metastases (no = 0, yes = 1)
dysphagia	Dyshpagia (no = 0, yes = 1)
dyspnoea	Dyspnoea (no = 0, yes = 1)
ecog	Eastern Cooperative Oncology Group score
fatigue	Fatigue (no = 0, yes = 1)
$lost_{weight}$	Lost weight (no = 0, yes = 1)
$lymphocyte_{10exp9}$	Lymphocytes ($x10^9$/l)
$mets_{bone}$	Presence of bone metastases (no = 0, yes = 1)
$mets_{liver}$	Presence of liver metastases (no = 0, yes = 1)
mgo_{cancer}	Primary cancer MGO (no = 0, yes = 1)
neutrophil	Neutrophils ($x10^9$/l)
$overall_{health}$	Global health score (very poor = 1, excellent = 7)
platelet	Platelet count ($x10^9$/l)
$primary_{breast}$	Primary cancer breast (no = 0, yes = 1)

pulse	Pulse rate
urea	Urea (mmol/l)
wbc	WBC ($x10^9$/l)

Two separate models have been developed for both PiPS-A and PiPS-B (four models in total) to predict the 2-week (14 day) and 2-month (56 day) survival of patients (thus generating three prognostic categories; <2 weeks, 2 weeks to 2 months and >2 months). The week and month models include different sets of predictors. For both models (weeks and months), if the predicted probability of the event exceeds 50% for a patient, then the patient is classified as being predicted to have the event. Otherwise, it is predicted that the patient will not have the event. Thus if, for example, the models predict that a patient will survive 2 weeks but will die within 2 months, then the PiPS model outcome will be that the patient is predicted to die in 'weeks'. A calculator for determining PiPS scores and risk groups is available at www.ucl.ac.uk/psychiatry/pips.

ALT, alanine transaminase; AMTS, abbreviated mental test score; CRP, C-reactive protein; LO, log odds; MGO, male genital organ; PiPS, Prognosis in Palliative care Study; PiPS-A, Prognosis in Palliative care Study – All; PiPS-B, Prognosis in Palliative care Study – Blood; WBC, white blood cell.

Adapted with permission from Stone et al.[2]

Supplementary Table S3. PPI model

	Partial score
Palliative Performance Score	
10%-20%	4
30%-50%	2.5
>50%	0
Delirium	
No	0
Yes	4
Dyspnoea at rest	
No	0
Yes	3.5
Oral intake	
Normal	0
Moderately reduced	1
Severely reduced	2.5
Peripheral oedema	
No	0
Yes	1
Risk groups	**Total score**
Predicted survival <3 weeks	>6
Predicted survival <6 weeks	>4

PPI, Palliative Prognostic Index.

Adapted with permission from Morita et al.[3]

Supplementary Table S4. Levels of evidence and grades of recommendation (adapted from the Infectious Diseases Society of America-United States Public Health Service Grading System[a])

Levels of evidence

I	Evidence from at least one large randomised, controlled trial of good methodological quality (low potential for bias) or meta-analyses of well-conducted randomised trials without heterogeneity
II	Small randomised trials or large randomised trials with a suspicion of bias (lower methodological quality) or meta-analyses of such trials or of trials with demonstrated heterogeneity
III	Prospective cohort studies
IV	Retrospective cohort studies or case–control studies
V	Studies without control group, case reports, expert opinions

Grades of recommendation

A	Strong evidence for efficacy with a substantial clinical benefit, strongly recommended
B	Strong or moderate evidence for efficacy but with a limited clinical benefit, generally recommended
C	Insufficient evidence for efficacy or benefit does not outweigh the risk or the disadvantages (adverse events, costs, etc.), optional
D	Moderate evidence against efficacy or for adverse outcome, generally not recommended
E	Strong evidence against efficacy or for adverse outcome, never recommended

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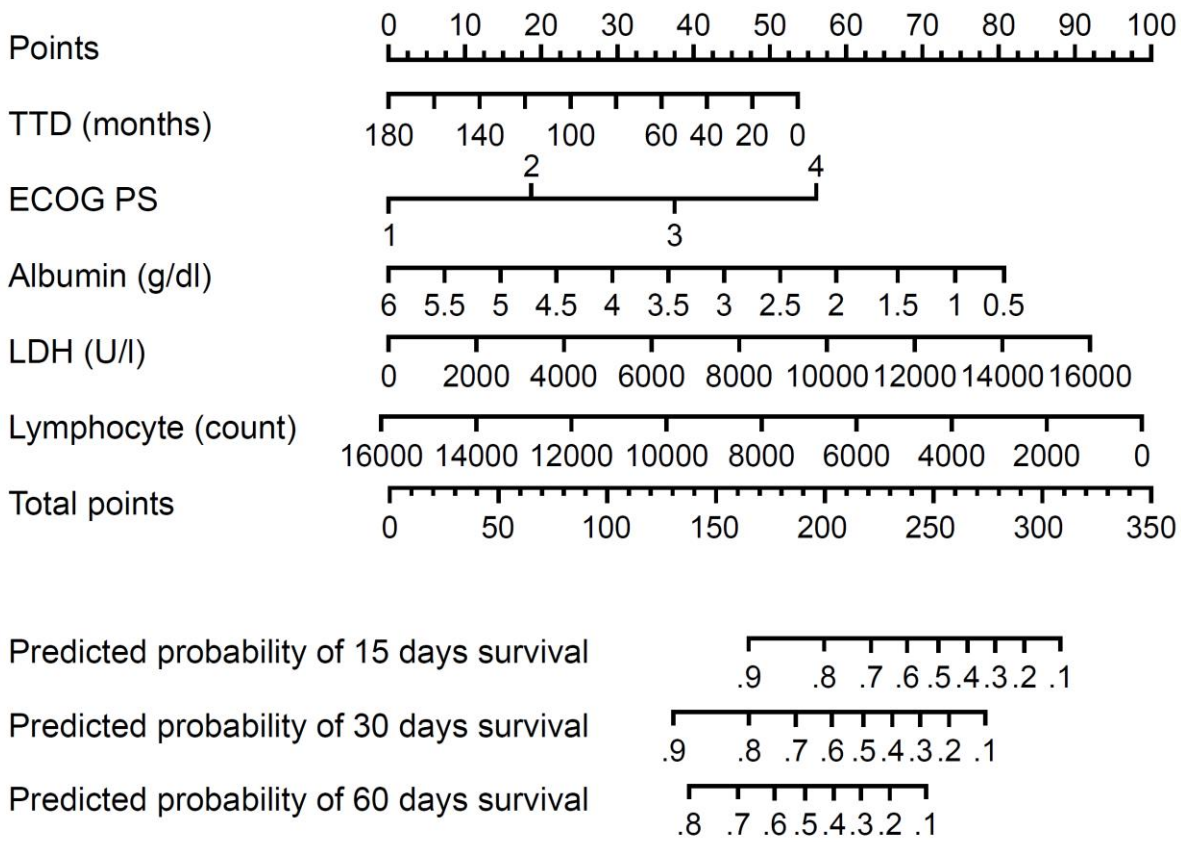
Supplementary Figure S1. FPN model



Nomogram for predicting the probability of 15-, 30- and 60-day survival. Points are assigned from time to initial diagnosis to TTD, ECOG PS, serum albumin levels, serum LDH levels and lymphocyte count by drawing a line upward from the corresponding values to the points line. The sum of these five points is plotted on the total points line. The total points line yields prediction of 15-, 30- and 60-day survival by drawing a line downward.

ECOG, Eastern Cooperative Oncology Group; FPN, Feliu Prognostic Nomogram; LDH, lactate dehydrogenase; PS, performance status; TTD, time to diagnosis of terminal disease.

Reproduced with permission from Feliu et al.[5]

REFERENCES

1. Maltoni M, Nanni O, Pirovano M, et al. Successful validation of the palliative prognostic score in terminally ill cancer patients. Italian Multicenter Study Group on Palliative Care. *J Pain Symptom Manage.* 1999;17(4):240-247.
2. Stone PC, Kalpakidou A, Todd C, et al. The Prognosis in Palliative care Study II (PiPS2): A prospective observational validation study of a prognostic tool with an embedded qualitative evaluation. *PLoS One.* 2021;16(4):e0249297.
3. Morita T, Tsunoda J, Inoue S, et al. The Palliative Prognostic Index: a scoring system for survival prediction of terminally ill cancer patients. *Support Care Cancer.* 1999;7(3):128-133.
4. Dykewicz C. Summary of the guidelines for preventing opportunistic infections among hematopoietic stem cell transplant recipients. *Clin Infect Dis.* 2001;33(2):139-144 (adapted from: Gross PA, Barrett TL, Dellinger EP et al. Purpose of quality standards for infectious diseases. *Clin Infect Dis.* 1994;1918:1421).
5. Feliu J, Jimenez-Gordo AM, Madero R, et al. Development and validation of a prognostic nomogram for terminally ill cancer patients. *J Natl Cancer Inst.* 2011;103(21):1613-1620.