Increased resting heart rate may indicate physical dysfunction, malnutrition, and poor prognosis in elderly patients with advanced non-small-cell lung cancer

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Introduction

➢ Resting heart rate (HR) was reported to predict prognosis in advanced lung cancer patients[1].

➢ Among PT in field of cancer rehabilitation, it is recognized that cancer patients with high HR tend to display low functional capacity.

➢ However, the direct relationship between resting HR and any principle statuses in cancer rehabilitation, including physical function, is not yet clear.

Aims

➢ The aim of this study is to clarify the relationship between resting HR and physical function, nutritional status and lean body mass in elderly patients with advanced non-small-cell lung cancer (NSCLC).

Method

【Study design】
A prospective longitudinal observational study (UMIN000009768)

【Sample size】
60 patients (Shizuoka Cancer Center, Japan)

【Eligibility criteria】
1) ≥ 70 years old and ECOG-PS 0-2
2) Newly diagnosed NSCLC in stage III, IV, or post-operative recurrence.
3) They planned to receive the first-line systemic chemotherapy or radiotherapy
4) Not having high risks for safe physical assessment

【Schedule of Assessments】

Diagnosis — **Evaluation** — Chemo or Radiotherapy

Entry
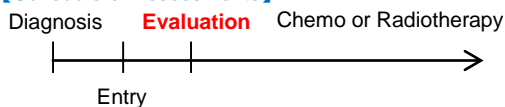
【Measurements】

Nutritional status assessment
- Mini Nutritional Assessment (MNA)

Body composition
- Lumbar skeletal muscle mass measurement (CT image analysis, Synapse VINCENT)
- Lean body mass (LBM)[2]

$=0.30 \times$ (skeletal muscle at L3 $[cm^2]$)$+6.06$

Physical capacity
- Incremental shuttle walking distance (ISWD)[3]
- Hand-grip strength

Resting heart rate
- Heart rate were measured after 5 minutes resting in supine position
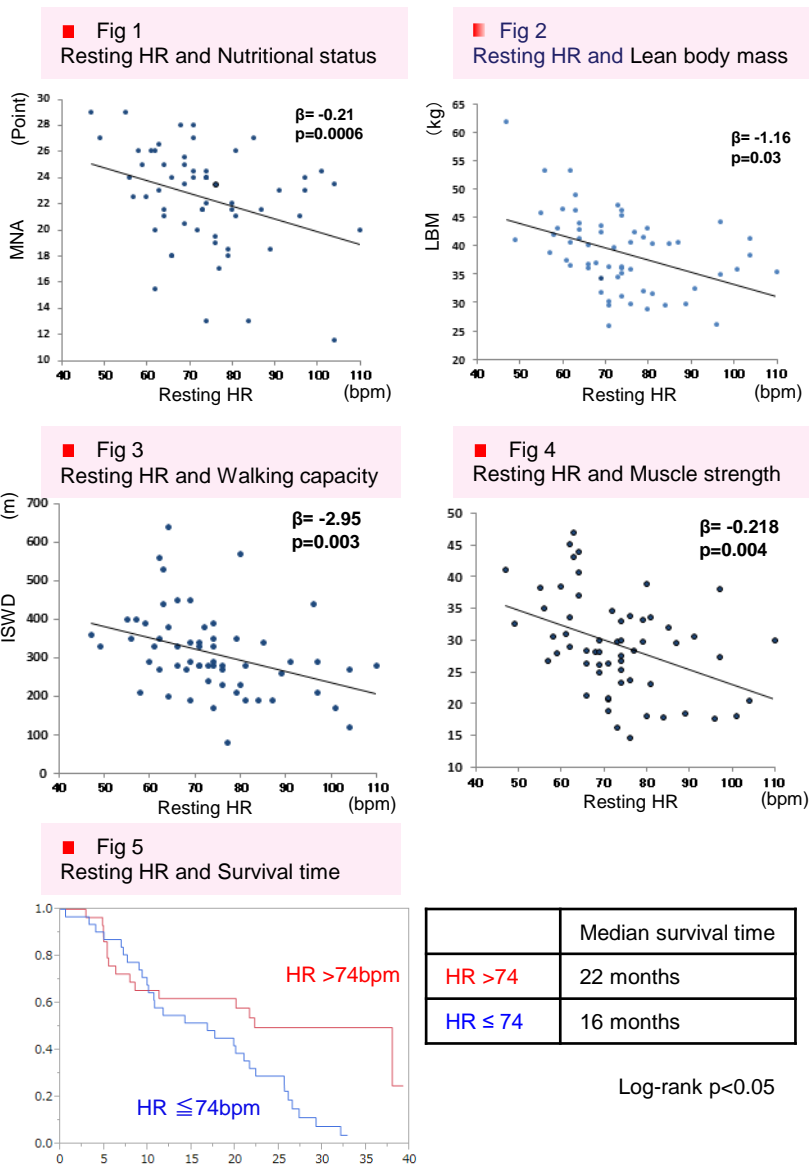
Patient characteristics

	N=60
Age, median (range)	76 (70-89)
Gender (F:M)	17:43
ECOG-PS 0-1-2	23 - 34 - 3
Stage III	31(51.6)
IV	29(48.3)
Radiotherapy	30（50）
Chemotherapy	
cytotoxic	24(40)
gefitinib	6(10)

Result

Physical parameters	Mean ± SE
Resting HR	74±13 bpm
MNA score	22.4±3.8 points
Lean body mass	54.7±10.6 kg
ISWD	312±107 m
Hand-grip strength Women Men	22.0±4.2 kg 32.2±6.7 kg

Higher the heart rate, …
- Poorer the nutrition (Fig 1)
- Smaller the muscle mass (Fig 2)
- Shorter the walking distance (Fig 3)
- Weaker the strength (Fig 4)
- Worse the prognosis (Fig 5)

■ Fig 1
Resting HR and Nutritional status

$\beta= -0.21$
$p=0.0006$

■ Fig 2
Resting HR and Lean body mass

$\beta= -1.16$
$p=0.03$

■ Fig 3
Resting HR and Walking capacity

$\beta= -2.95$
$p=0.003$

■ Fig 4
Resting HR and Muscle strength

$\beta= -0.218$
$p=0.004$

■ Fig 5
Resting HR and Survival time

HR >74bpm
HR ≦74bpm

	Median survival time
HR >74	22 months
HR ≤ 74	16 months

Log-rank p<0.05

Cutoff was set to the median of resting HR

Conclusion

■ Resting HR might be an easy and sensitive biomarker in detecting physical and nutritional risks.
■ Higher resting HR indicates that patient has poorer nutritional and physical status.
■ Thus, it helps us to make a clinical decision and set an optimal goal for advanced cancer patients.

REFERENCES

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Further information

There is no conflict of interest. .

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