

Theme: Clinical

Abstract No: PTCOG-AO2025-ABS-0063

Abstract Title: Safety and Efficacy of Carbon-Ion Radiotherapy for Stage I Non-Small Cell Lung Cancer in Elderly Patients

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Background / Aims:

- To evaluate clinical outcomes and adverse events of carbon-ion radiotherapy (CIRT) for stage I non-small cell lung cancer (NSCLC) in patients aged ≥80 years.

Subjects and Methods:

- Consecutive stage I NSCLC patients treated with CIRT at Gunma University Heavy Ion Medical Center (June 2010–July 2022) were retrospectively reviewed.
- Patients were stratified by age (<80 vs ≥80 years).
- Survival was analyzed by Kaplan–Meier with log-rank; competing risks by cumulative incidence with Gray’s test; adverse events were graded per CTCAE v5.0.

Result:

- A total of 167 patients were included (median follow-up, 47.4 months overall; 58.4 months among survivors).
- The ≥80-year group had higher proportions of female sex, ECOG performance status 1–2, and T1c–T2a stage.
- Clinical outcomes and adverse events were comparable between age groups, supporting CIRT as an appropriate option for patients aged ≥80.

Table 1. Patient characteristics

Characteristic	Overall N = 167	<80 years N = 109	≥80 years N = 58
Age, years	75 (48-91)	72 (48-79)	83 (80-91)
Sex			
Male	116 (69%)	87 (80%)	29 (50%)
Female	51 (31%)	22 (20%)	29 (50%)
ECOG performance status			
0	52 (31%)	44 (40%)	8 (14%)
1	107 (64%)	61 (56%)	46 (79%)
2	7 (4.2%)	3 (2.8%)	4 (6.9%)
3	1 (0.6%)	1 (0.9%)	0 (0%)
Histology			
Clinical diagnosis	74 (44%)	49 (45%)	25 (43%)
Adenocarcinoma	62 (37%)	40 (37%)	22 (38%)
Squamous cell carcinoma	30 (18%)	19 (17%)	11 (19%)
Non-small cell carcinoma	1 (0.6%)	1 (0.9%)	0 (0%)
TNM classification (UICC 8th)			
T1aN0M0	18 (11%)	14 (13%)	4 (6.9%)
T1bN0M0	65 (39%)	47 (43%)	18 (31%)
T1cN0M0	42 (25%)	23 (21%)	19 (33%)
T2aN0M0	42 (25%)	25 (23%)	17 (29%)
Dose/fractions			
52.8 Gy (RBE)/4 Fr	46 (28%)	33 (30%)	13 (22%)
60.0 Gy (RBE)/4 Fr	118 (71%)	74 (68%)	44 (76%)
64.0 Gy (RBE)/16 Fr	3 (1.8%)	2 (1.8%)	1 (1.7%)

Median (Min-Max); n (%). RBE, relative biological effectiveness.

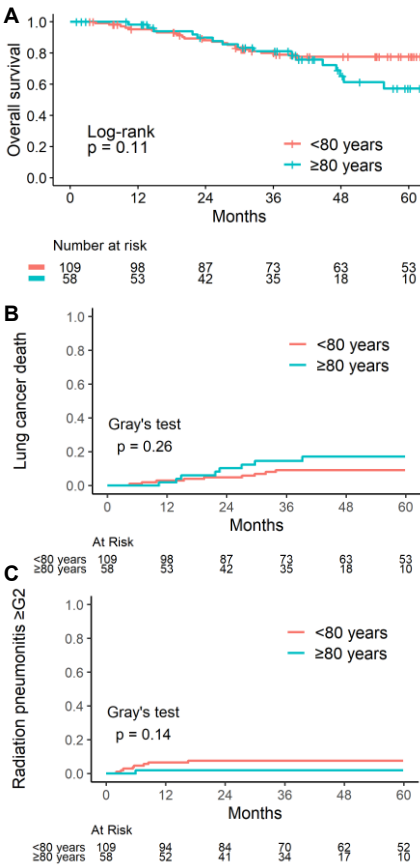


Figure 1. (A) Overall survival by Kaplan-Meier; (B) cumulative incidence of lung cancer-specific death (competing: other-cause death) and (C) radiation pneumonitis ≥grade2 (competing: all-cause death).