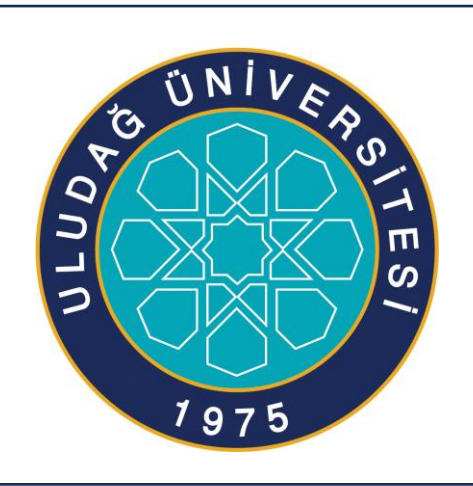




EP07.55- Stereotactic Body Radiotherapy With CyberKnife-M6 for Non-Small Cell Lung Cancer

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INTRODUCTION

The aim of the study was to evaluate local control and survival in patients with non-small cell lung cancer (NSCLC) who underwent stereotactic body radiotherapy (SBRT) using the lung-optimized treatment (LOT) module with the next-generation CyberKnife M6 (CK-M6).

METHODS

Design:
49 lesions in 46 patients were treated between May 2019 and April 2025. A planning 4D-CT was obtained in a free-breathing modality. Tracking modality was selected based on the target’s visibility on the device, prospectively. For PTV, a 3-5 mm margin was added to the target based on the tracking method. The median prescribed dose was 50 Gy in 5 fractions (30-55 Gy in 1-7 fractions) (Table 1, Fig.1). Survival analysis was performed using Kaplan-Meier and Cox regression analysis for 49 lesions. A p-value < 0.005 was considered significant.

DISCUSSION AND CONCLUSION

Actionable Take Away Message

- The LOT module of the CK-M6 Xsight lung tracking system enables the application of fiducial-free motion management strategies. The advantage of our study is that the most appropriate tracking modality can be selected before treatment. Thus, it was possible to reduce toxicity with a narrower PTV margin without affecting local control.

Future Direction for Research

- * Large-scale, multicenter prospective studies with larger sample sizes should be conducted to compare it with other respiratory monitoring systems.

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RESULTS

- * The median follow-up was 30 months (5-80). Zero-, 1-, and 2-view tracking were applied to 21, 22, and 6 lesions, respectively. Grade ≥ 3 toxicity was not observed. 2-year local recurrence-free (LRFS), overall (OS) and progression-free (PFS) survival rates were 81,7%, 71,7%, and 65,2, respectively (Fig.2).
- * **Multivariate analysis, unfavorable factors:**
1- For OS; 12-month partial response (vs complete response, p<0.001), beam-on time ≤ 22 min (vs >22 min, p=0.005), and dose <50 Gy (vs ≥50 Gy, p=0.042)
2- For PFS; 12-month partial response (vs complete response, p=0.021), and female gender (vs male, p=0.021)
3- No significant factors were found for LRFS.

Table 1: Clinical characteristics.

Features	N (range, %)
Median age (years, range) (n: 46 patients)	68 (46-81)
Gender (n: 46 patients)	
Male	41 (89)
Female	5 (11)
Karnofsky performance status (n: 46 patients)	80 (50-100)
Smoking pack/year (median) (n: 43 patients)	50 (12,5- 165)
Histology (n: 46 patients)	
Adenocarcinoma	21 (46)
Squamous cell carcinoma	14 (30,5)
Adenosquamous cell carcinoma	1 (2)
Large cell neuroendocrine carcinoma (LCNEC)	1 (2)
LCNEC + Small cell lung carcinoma (SCLC)	1 (2)
Non-small cell lung carcinoma	2 (4,5)
Histological diagnosis absent	6 (13)
Stage before SBRT (AJCC 2018) (n: 46 patients)	
I	30 (65)
II	4 (9)
III	4 (9)
IV (oligometastatic)	8 (17)
Tumor size (mm) (n: 49 lesions)	20 (8-57)
Target lesions (n: 49 lesions)	
Primary	43 (88)
Synchronous primary (2 lesions in one patient)	2 (4)
Primary + lung metastasis (4 lesions in 2 patients)	4 (8)
Localization (n: 49)	
Right	26 (53)
Left	23 (47)
Prescription dose (Gy/fx) (n: 49 lesions)	50/5 (30/1- 55/5)
Response at median 3rd mo (1-4 mo) (n: 40 lesions)	
Complete	7 (17,5)
Partial	25 (62,5)
Stable	8 (20)
Response at 12th mo (n: 47 lesions)	
Complete	15 (32)
Partial	24 (51)
Stable	2 (4)
Progression	6 (13)

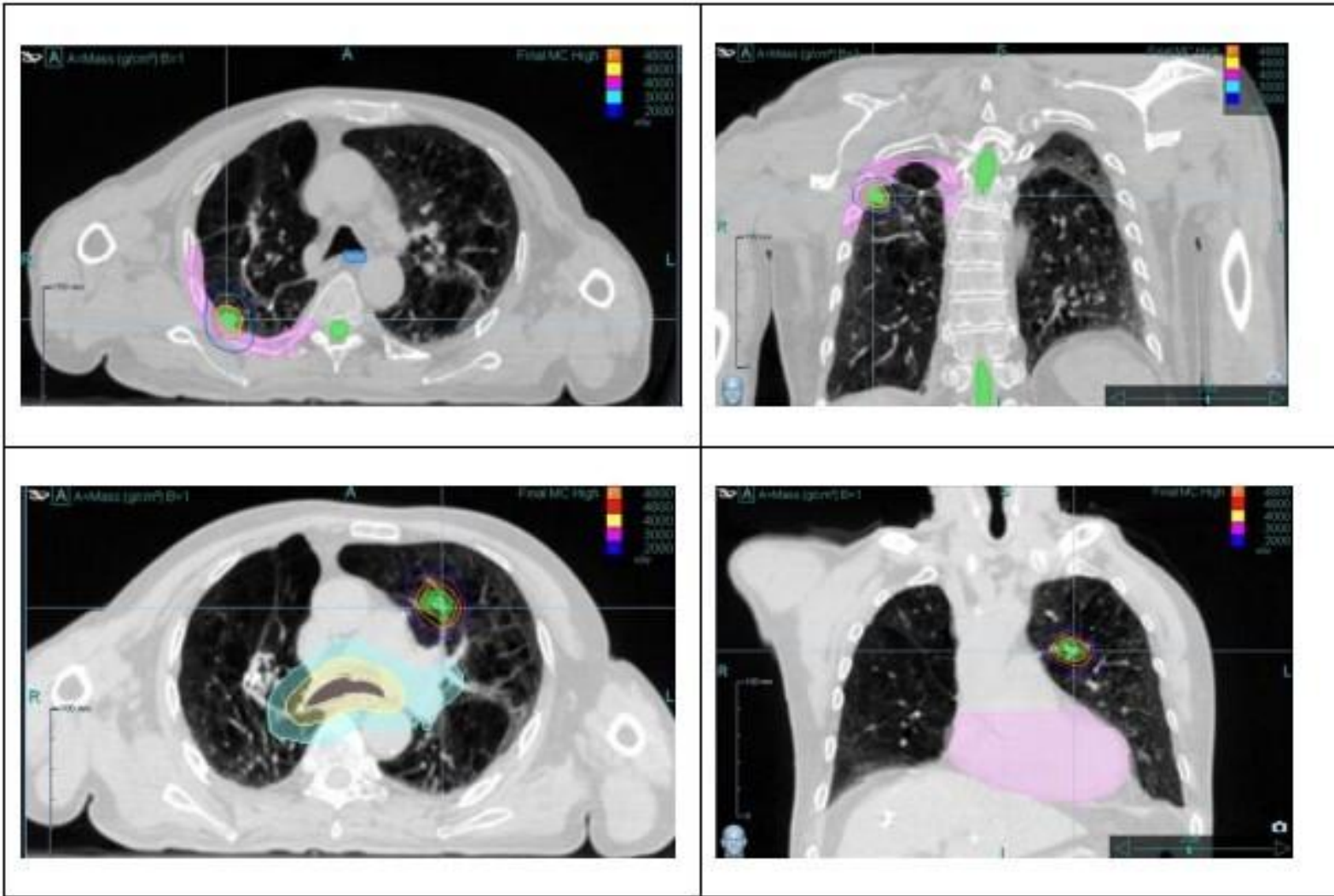


Fig 1. A 72-year-old male patient presented with synchronous primary pulmonary SCC. He had a 12 mm lesion in the right lung lower lobe, and a 15 mm lesion in the left lung upper lobe, both of stage was kT1bNxMx (IA2). He received 48 Gy in 4 fractions SBRT with 2-view tracking using a CyberKnife-M6 LOT module on both of peripheral lesions. He showed a complete response at the first follow-up at 3 months and remained alive without any recurrences after 30 months of follow-up. Upper row: isodose lines for right lesion, bottom row: isodose line for left lesion.

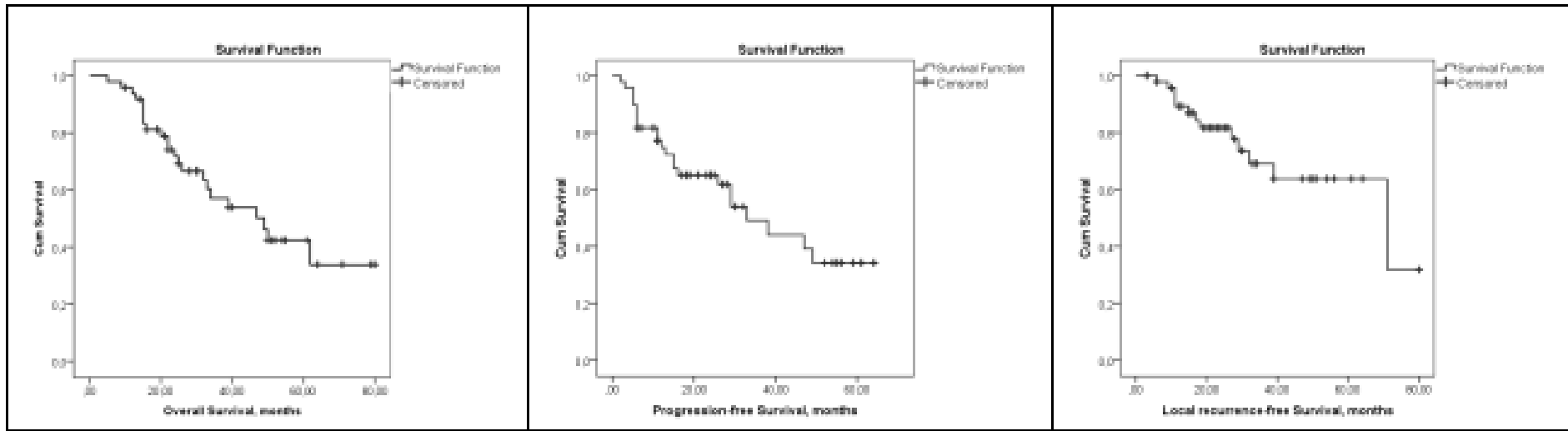


Fig.2. Kaplan-Meier survival curves for all patients.