

Prognostic Value of Circulating miR-139-5p as a Liquid Biopsy Biomarker in Metastatic Non-Small Cell Lung Cancer

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Liquid Biopsy · Circulating microRNA · Prognosis · Lymph Node Metastasis



The Case for a Circulating microRNA Biomarker in NSCLC

An unmet clinical need

Metastatic non-small cell lung cancer (NSCLC) carries a poor prognosis, and reliable non-invasive investigating tools for risk stratification and disease monitoring remain limited.

Why circulating miRNAs?

Circulating microRNAs are stable in serum and resistant to degradation, easily sampled by liquid biopsy, and have emerged as promising candidates for cancer prognosis and monitoring.

Why miR-139-5p?

miR-139-5p has been involved in tumor progression and metastasis in NSCLC and other malignancies, making it a possible biological prognostic marker.

Study Aim To evaluate the prognostic significance of circulating miR-139-5p in patients with metastatic NSCLC.



1st

Leading cause of cancer death worldwide



80%

Of this cohort presented with lymph node metastasis



20–25 nt

Length of miRNAs — small non-coding regulators of gene expression

Study Design & Biomarker Workflow



Design

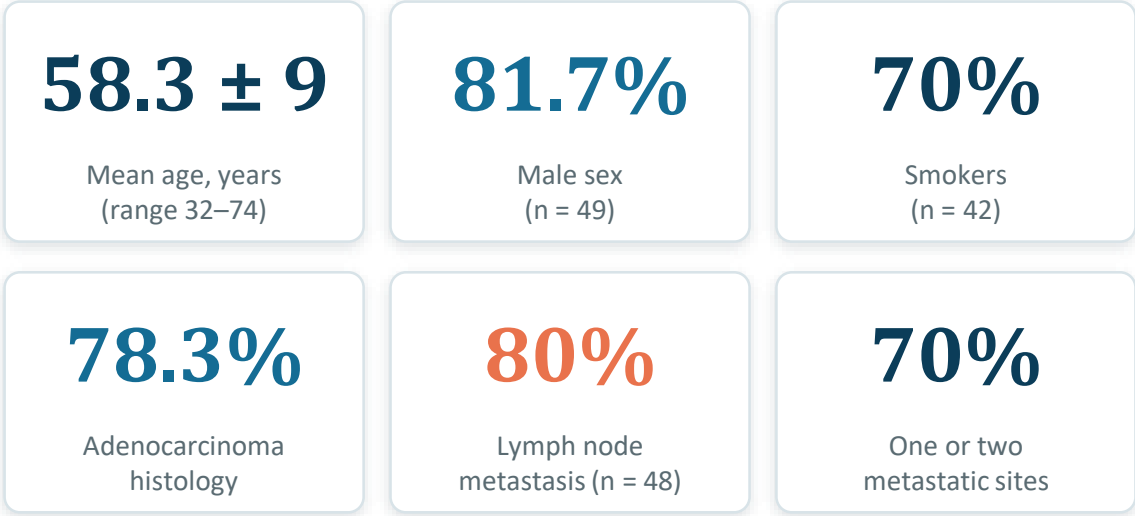
Mixed design: first part cross-sectional then prospective cohort (follow-up after chemotherapy).
Conducted at the National Cancer Institute, Cairo University (Feb 2022 – Dec 2024).

Statistical Analysis

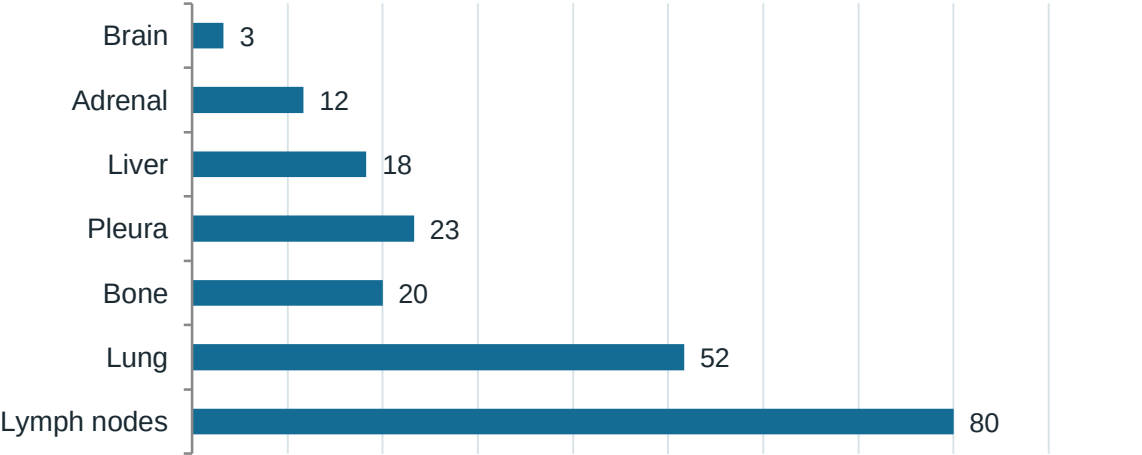
SPSS v26. Chi-square / Fisher's exact for categorical associations. Kaplan-Meier with log-rank test and Cox regression for survival. $P < 0.05$ considered significant.

Sampling Timepoints: Baseline (n = 60, prior to chemotherapy) → Post-treatment (n = 48, completed 4 cycles)

Patient & Disease Characteristics (n = 60)



Site of Metastasis

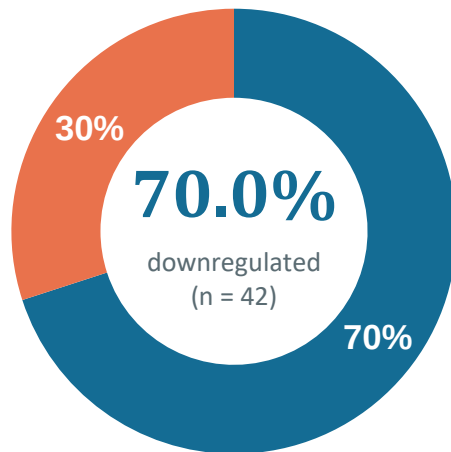


Characteristic	n (%)
Age ≥ 60 years	30 (50.0%)
Performance status II	16 (26.7%)
Squamous cell carcinoma	13 (21.7%)
Tumor size 5–10 cm	41 (68.3%)
Diabetes mellitus	7 (11.7%)
Hypertension	11 (18.3%)
Completed 4 chemo cycles	48 (80.0%)
Regressive or stable response	34 (70.8%)
Progressive disease	14 (29.2%)

RESULTS II

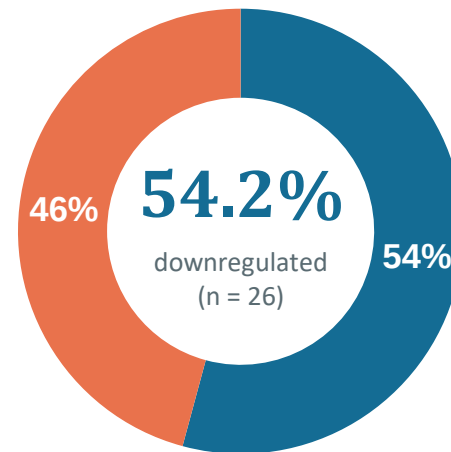
Circulating miR-139-5p Expression: Baseline vs. Post-Chemotherapy

Baseline (n = 60)



■ Downregulated ■ Upregulated

Post-Chemotherapy (n = 48)



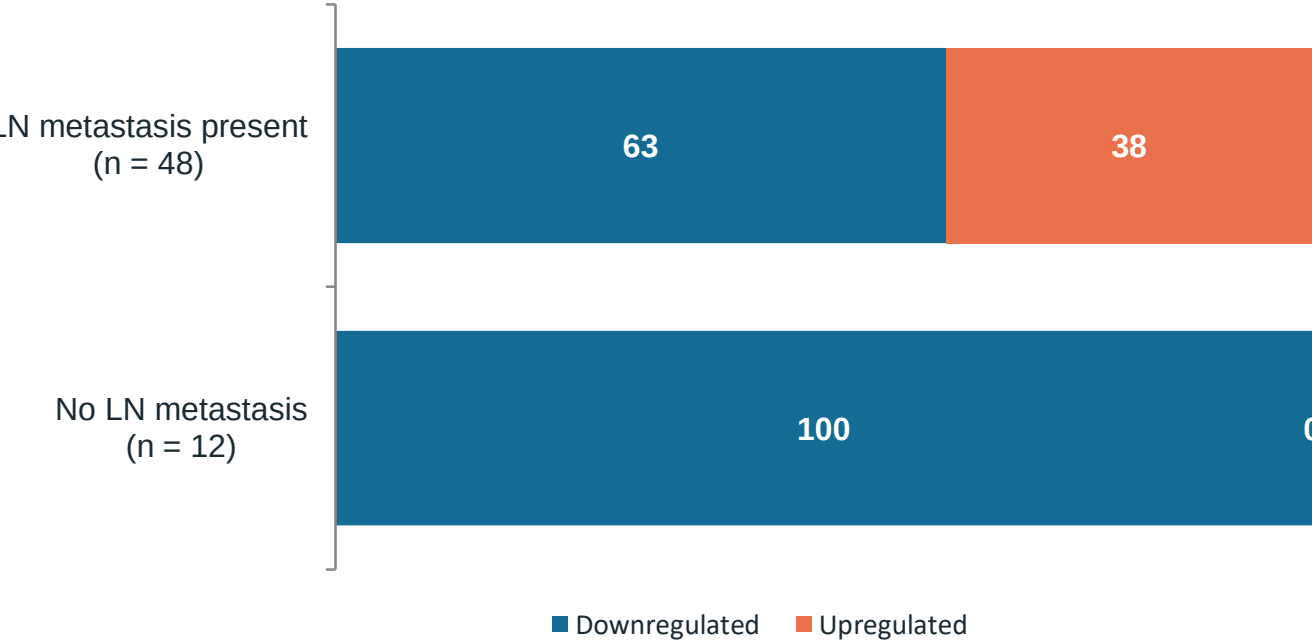
■ Downregulated ■ Upregulated



miR-139-5p was predominantly downregulated at both timepoints, consistent with its proposed tumor-suppressor role in NSCLC.

Key observation: The proportion of downregulated cases fell from 70.0% at baseline to 54.2% after 4 cycles of chemotherapy, suggesting a partial shift toward upregulation with treatment although this change did not reach statistical significance for miR-139-5p specifically.

miR-139-5p Downregulation Is Significantly Associated with Lymph Node Metastasis



P = 0.011

Chi-square test, LN-positive vs. LN-negative patients

What this means

- All 12 node-negative patients (100%) showed miR-139-5p downregulation.
- Among 48 node-positive patients, 62.5% were downregulated and 37.5% upregulated.
- Consistent with reports by Yong-Hao et al. (2019) and Zhang et al. (2020) linking low miR-139-5p to nodal spread and advanced stage.

	Downregulated	Upregulated	Total
No LN metastasis	12 (100.0%)	0 (0.0%)	12
LN metastasis present	30 (62.5%)	18 (37.5%)	48

Treatment Response & Survival:

This Cohort (n = 60 / 48)

Chemotherapeutic response (RECIST)

miR-139-5p expression did not differ significantly between responders regressive/stable disease and progressive disease groups ($P > 0.05$).

Overall survival (Kaplan–Meier)

Median OS for the cohort was 15 months (1-year OS 60%, 2-year OS 36.7%).
miR-139-5p expression alone did not reach statistical significance for OS in this cohort.

Supporting Literature

Yong-Hao et al., 2019

Lower miR-139-5p was associated with advanced clinical stage, adenocarcinoma, tumors > 3 cm, and lymph node metastasis ($P < 0.05$).

Zhang et al., 2020

miR-139-5p was reduced in NSCLC tissue vs. normal tissue ($P < 0.05$) and downregulation correlated with advanced clinical stage ($P < 0.005$) and poorer overall survival on Kaplan–Meier analysis ($P < 0.05$).

Our nodal-metastasis finding aligns in a positive manner with this literature; larger cohorts are needed to confirm an independent survival/response signal for miR-139-5p.

CONCLUSION

Circulating miR-139-5p: A Possible Candidate Marker of Nodal Spread in Metastatic NSCLC

1

Circulating miR-139-5p was predominantly downregulated in metastatic NSCLC, both at baseline and after first-line chemotherapy.

2

Downregulation was significantly associated with lymph node metastasis ($P = 0.011$), supporting its role in nodal disease spread.

3

A significant, independent link to chemotherapy response or overall survival was not demonstrated for miR-139-5p in this cohort; this contrasts with some prior reports and warrants larger studies.

4

Circulating miR-139-5p remains a reasonable biological, non-invasive marker for risk stratification however further large-scale studies are warranted.

Presenting Author Conflict of Interest Statement



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No conflicts of interest to disclose.

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