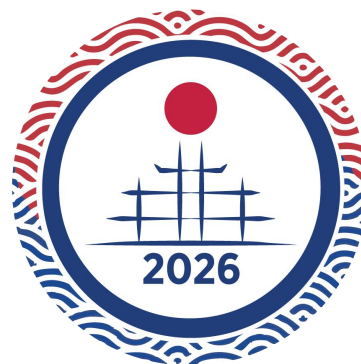


Electrolyte Abnormalities, Lymphocyte Associations and Survival in Stage IV NSCLC: A Multicenter Real-World Validation

H. Ying¹, Y. Pu², G. Liao³, X. Li³, Z. Li³, Y. Liu⁴, X. Wu⁴, M. Yang⁴, S. Wang⁴, F-M. Kong⁵

¹University of Hong Kong-Shenzhen Hospital, Shenzhen/CN; ²Hong Kong University Shenzhen Hospital, Shenzhen/HK; ³Shenzhen People's Hospital (The Second Clinical Medical College of Jinan University, the First Affiliated Hospital of Southern University of Science and Technology), Shen Zhen/CN; ⁴Peking University Shenzhen Hospital, Shen Zhen/CN; ⁵Hong Kong University Shenzhen Hospital, Shen Zhen/CN



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INTRODUCTION

Clinical context

Electrolyte abnormalities are common during advanced NSCLC care, but their **reproducible prognostic value** remains under-characterized.

Why electrolytes?

Sodium, potassium, corrected calcium, and lymphocyte count are inexpensive, routinely available markers that may reflect **systemic reserve** and host vulnerability.

Study question

We tested whether **electrolyte abnormalities** at 1L start and 1L end identify high-risk stage IV NSCLC patients and correlate with lymphocyte count.

METHODS

Cohort

Multicenter real-world stage IV NSCLC cohort: **N=434** treated with first-line systemic therapy across three Shenzhen hospitals (2019–2026).

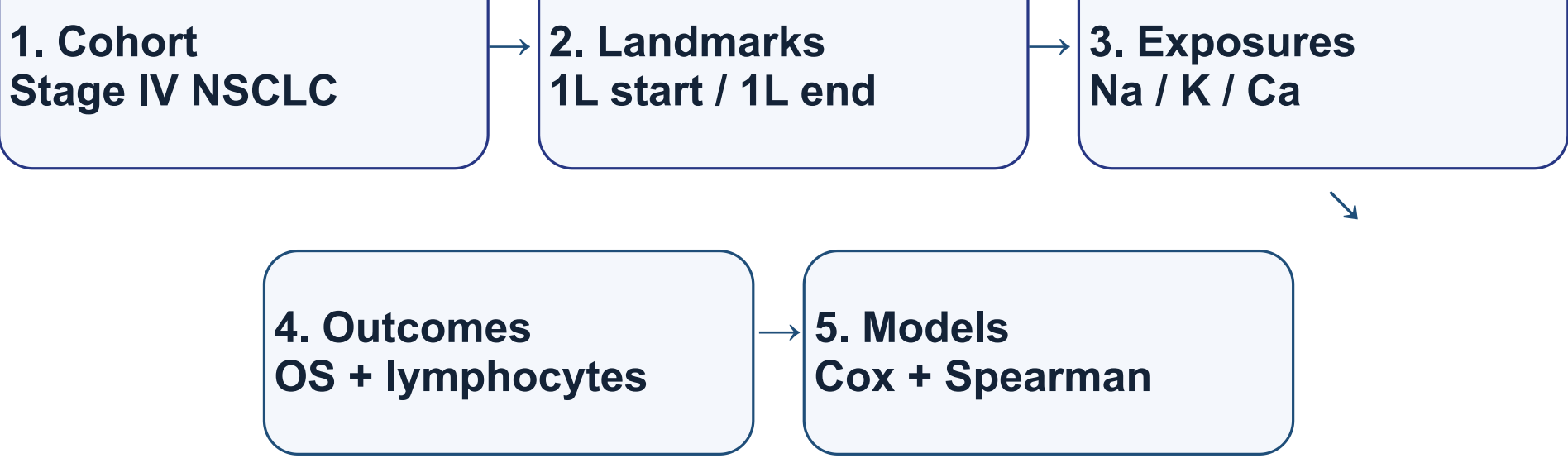
Laboratory definitions

Hyponatremia: Na <135 mmol/L; **hypokalemia**: K <3.5 mmol/L; **hypocalcemia**: albumin-corrected calcium <2.15 mmol/L.

Analyses

Overall survival was measured from 1L start. Multivariable **Cox models** evaluated survival; **Spearman correlations** assessed electrolyte–lymphocyte associations.

Workflow



BASELINE CHARACTERISTICS

Characteristic	Overall	Normal Na	Hyponatremia	Hypocalcemia
N	434	345	68	91
Age, median (range)	62 (32–88)	62 (32–88)	64 (35–80)	66 (33–84)
Male sex, n (%)	375 (87.8%)	314 (86.5%)	61 (95.3%)	56 (86.2%)
Ever smoker, n (%)	126 (29.5%)	103 (28.4%)	23 (35.9%)	18 (27.7%)
ECOG PS, median (IQR)	1 (1–2)	1 (1–2)	1 (1–2)	1 (1–4)
BMI, median (IQR)	22.8 (20.6–25.2)	22.9 (20.6–25.3)	22.1 (20.6–23.2)	22.6 (21.2–24.6)
CCI, median (IQR)	4 (3–5)	4 (2–5)	4 (3–5)	4 (3–5)
Adenocarcinoma, n (%)	371 (86.9%)	315 (86.8%)	56 (87.5%)	58 (89.2%)
Squamous, n (%)	59 (13.8%)	51 (14.0%)	8 (12.5%)	7 (10.8%)
Driver recorded, n (%)	367 (85.9%)	315 (86.8%)	52 (81.2%)	59 (90.8%)
CT-containing 1L, n (%)	199 (46.6%)	164 (45.2%)	35 (54.7%)	27 (41.5%)
ICI-containing 1L, n (%)	85 (19.9%)	68 (18.7%)	17 (26.6%)	12 (18.5%)
TKI-containing 1L, n (%)	229 (53.6%)	200 (55.1%)	29 (45.3%)	41 (63.1%)
Bone metastasis, n (%)	283 (66.3%)	239 (65.8%)	44 (68.8%)	50 (76.9%)
Liver metastasis, n (%)	117 (27.4%)	92 (25.3%)	25 (39.1%)	22 (33.8%)
Brain metastasis, n (%)	201 (47.1%)	165 (45.5%)	36 (56.2%)	36 (55.4%)
Baseline Na, mmol/L	139.0 (136.0–141.0)	139.0 (138.0–141.0)	133.0 (130.7–133.6)	137.0 (133.0–140.1)
Corrected Ca, mmol/L	2.25 (2.15–2.33)	2.26 (2.19–2.33)	2.14 (2.01–2.31)	2.07 (2.00–2.11)
Lymphocyte, 10 ⁹ /L	1.37 (1.00–1.81)	1.42 (1.04–1.83)	0.91 (0.62–1.46)	0.88 (0.65–1.25)
Death events, n (%)	163 (38.2%)	126 (34.7%)	37 (57.8%)	32 (49.2%)
OS from 1L start, d	679 (302–1246)	697 (314–1262)	592 (284–1172)	633 (222–1400)

REFERENCES & ACKNOWLEDGEMENTS

Selected references

Berardi et al. Support Care Cancer. 2015; Castillo et al. J Clin Oncol. 2012; Kargiotis et al. Clin Lung Cancer. 2017.

Acknowledgements

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RESULTS, CONCLUSIONS AND DISCUSSION

Core survival signal

Baseline hyponatremia was associated with inferior OS: **adjusted HR 1.72** (95% CI 1.17–2.53; **P=0.006**).

End-of-1L hyponatremia showed a consistent adverse signal: **adjusted HR 1.80** (95% CI 1.24–2.61; **P=0.002**).

Hypocalcemia also carried prognostic information: **HR 1.45** (95% CI 1.02–2.07; P=0.040).

Figure 1

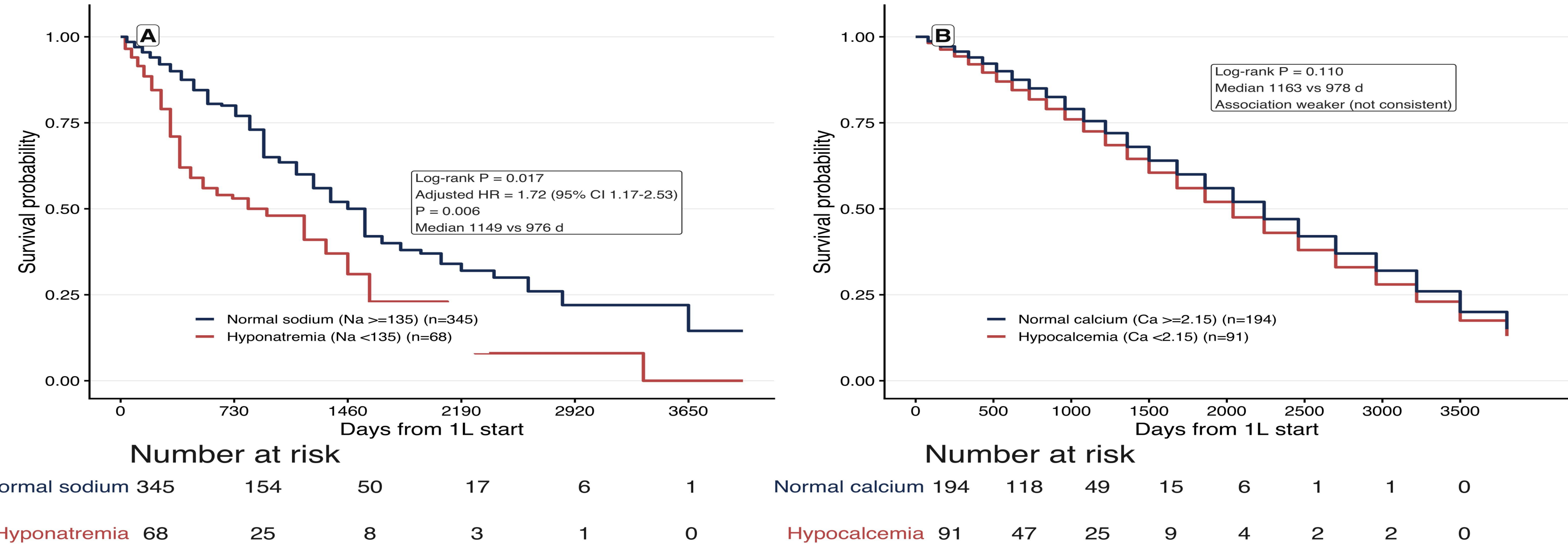


Figure 1. Electrolyte abnormalities and overall survival in stage IV NSCLC.

Figure 2: Hyponatremia and hypocalcemia are associated with lower lymphocyte counts in stage IV NSCLC

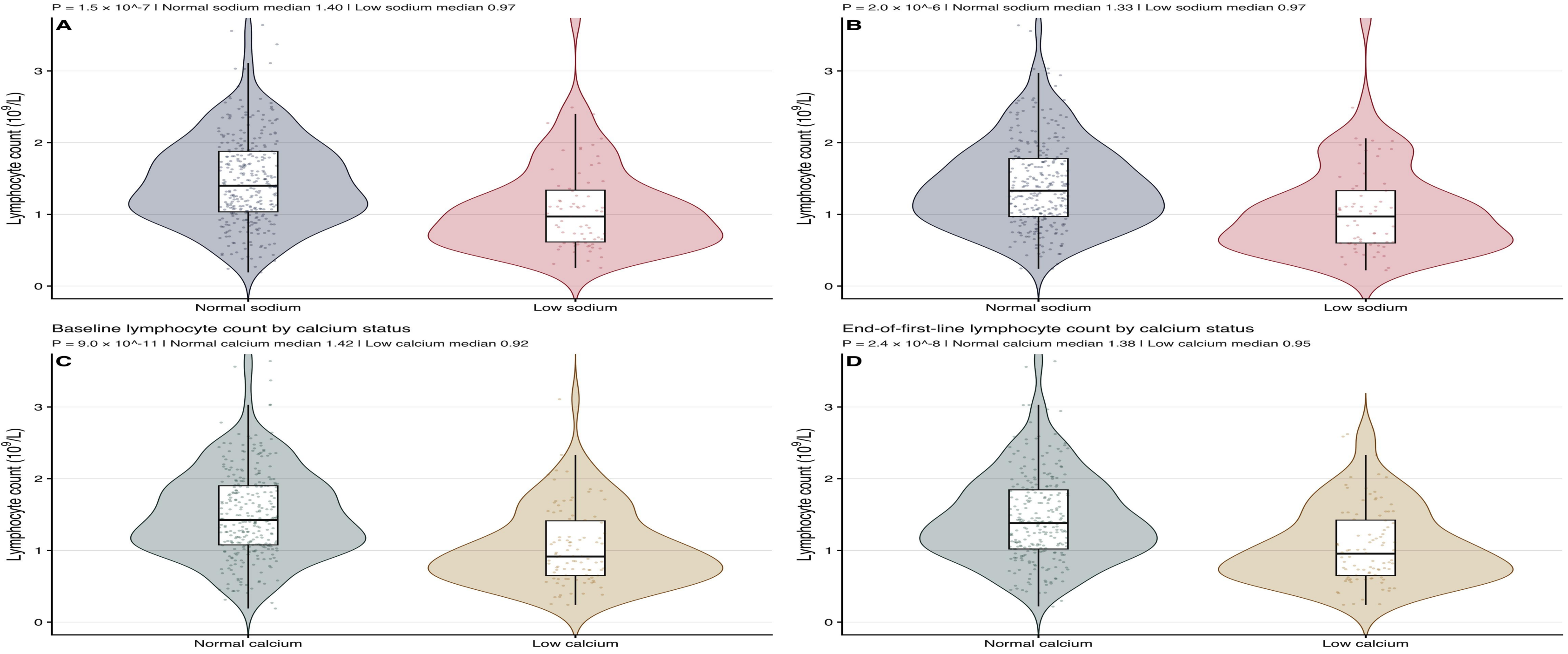


Figure 2. Lymphocyte count associations with sodium and corrected calcium at 1L start and 1L end.

Clinical meaning

Sodium is a simple, low-cost laboratory marker that may capture treatment vulnerability and systemic reserve in stage IV NSCLC.

The reproducible sodium–lymphocyte relationship suggests a clinically interpretable link between electrolyte disturbance and host immune/nutritional status.

Fig. 1 key

Hyponatremia: strongest validated survival signal.

Baseline Na: HR 1.72; P=0.006.

End-of-1L Na: HR 1.80; P=0.002.

Fig. 2A–B key

Sodium: positively correlated with lymphocyte count.

Baseline: r=0.273; P=5.96×10^{−8}.

End-of-1L: r=0.250; P=3.16×10^{−6}.

Fig. 2C–D key

Hypocalcemia: associated with lower lymphocyte counts.

Baseline: P=2.56×10^{−7}.

End-of-1L: P=4.00×10^{−8}.