



Predicting Lymph Node Metastasis in Part-Solid Lung Adenocarcinomas with a Maximum Solid Portion Diameter of 30.0 mm

Control #: 2711

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INTRODUCTION

- **Lymph node (LN) metastasis** is a critical prognostic factor in non-small cell lung cancer (NSCLC), yet its incidence in PSNs is remarkably low^{1,2}.
- Compared with CTR, **solid portion diameter** may be a more direct predictor of LN status^{3,4}.
- **AIM:** To determine the incidence of lymph node metastasis and identify the most reliable clinic-radiological predictor in part-solid lung adenocarcinomas with solid portion diameter ≤ 30.0 mm.

METHODS

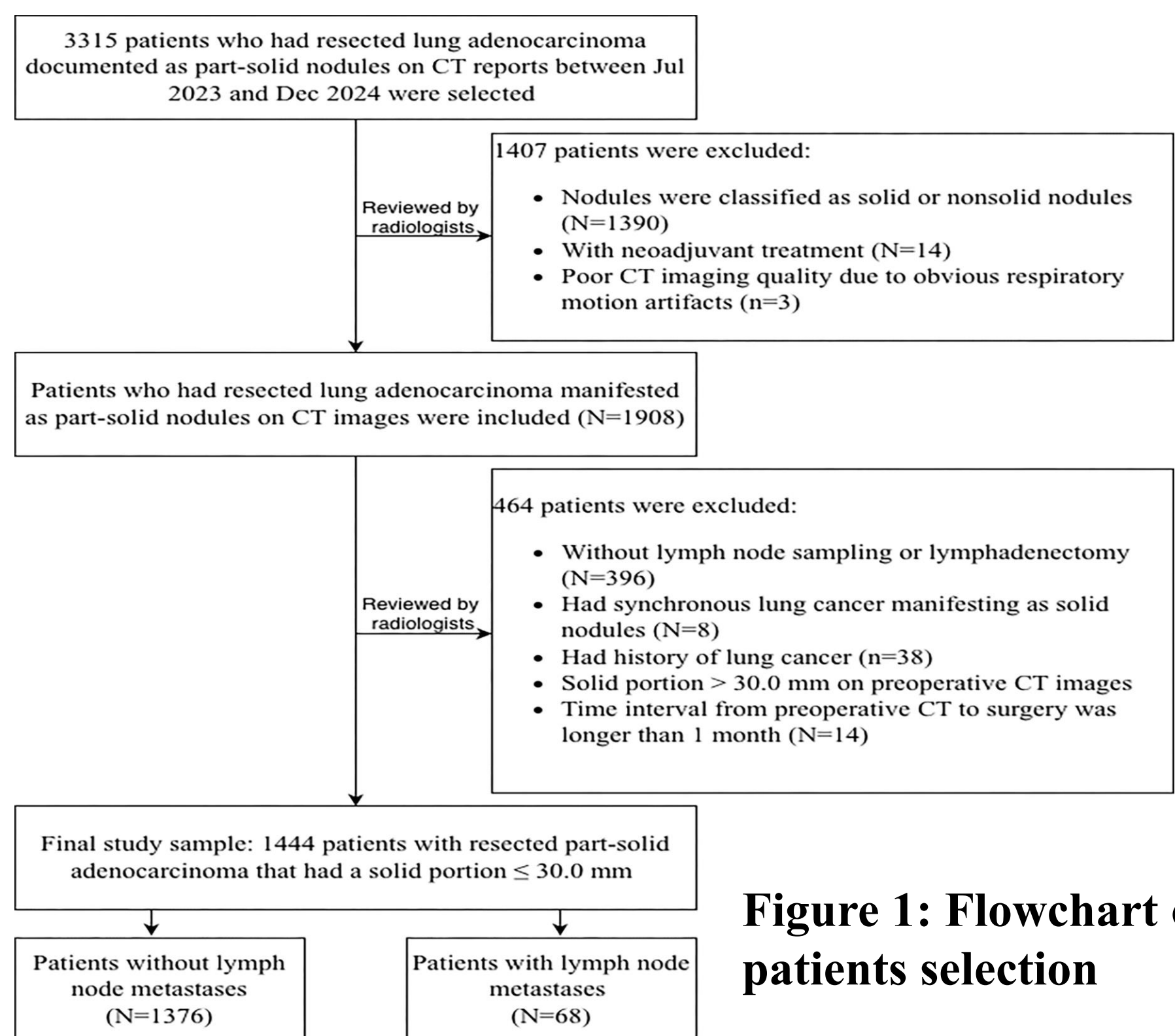
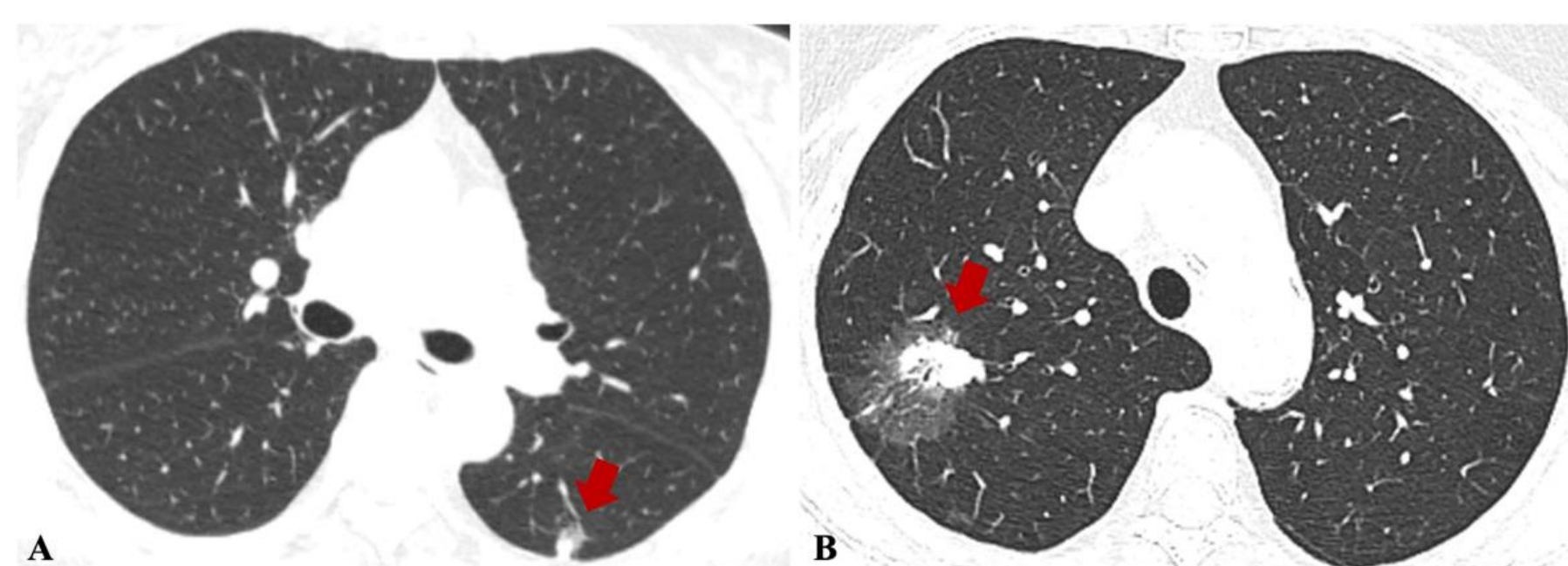


Figure 1: Flowchart of patients selection



(A) A 54-year-old woman with a part-solid nodule (PSN) (CTR = 0.58) in the left lower lobe, IAC without lymph node metastasis; (B) A 79-year-old woman with a PSN (CTR = 0.47) in the right upper lobe, IAC with N2b metastasis. [†]

Figure 2: CT Images from Two Patients Demonstrating Two Part-solid Lung Adenocarcinomas.

RESULTS

- Solid portion diameter (OR=1.25, 95%CI: 1.20-1.31), overall tumor size (OR=1.13, 95%CI: 1.10-1.17), CTR (OR=69.19, 95%CI: 16.71-306.98), non-smooth margin (OR=2.17), irregular shape (OR=2.34), pleural retraction (OR=2.20), air bronchogram (OR=4.72), and enlarged LN on CT (OR=4.47) were significant predictors of LN metastasis in part-solid lung adenocarcinomas.
- Solid portion diameter was the only independent predictor of LN metastasis (OR=1.25, 95%CI: 1.20-1.31), demonstrating superior diagnostic performance over CTR (AUC: 0.86 vs 0.75, $P < 0.001$), with better calibration (Brier score: 0.039 vs 0.044) and greater net benefit.
- Clinical actionable cutoff for solid portion diameter: 7.3 mm (sensitivity: 95.6%, specificity: 49.6%, NPV: 99.6%).
- $CTR \leq 0.25$: LN metastasis rate = 0% (0/123) $\rightarrow$ LN dissection may be safely omitted. Solid portion diameter ≤ 6.0 mm: LN metastasis rate = 0.2% (1/552) $\rightarrow$ LN dissection is generally unnecessary.

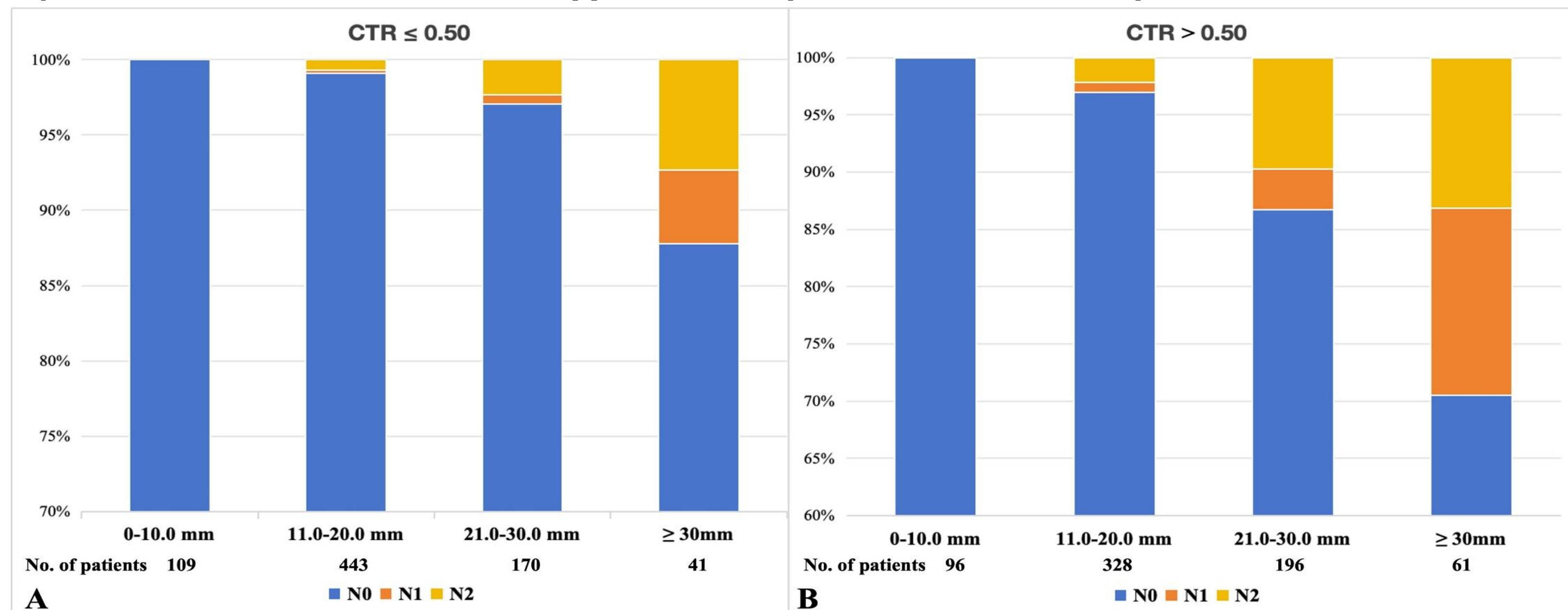


Figure 3: Lymph Node Metastases Distribution in Part-solid Lung Adenocarcinoma Based on Overall Tumor Size.

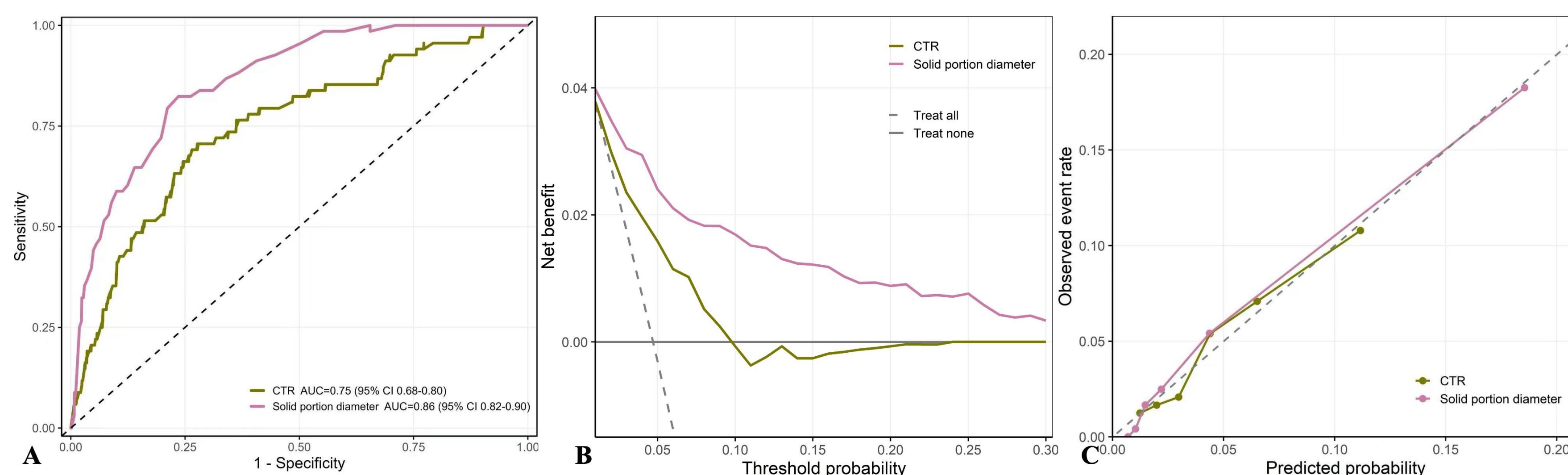


Figure 4: Discrimination performance of Solid Portion Diameter and Consolidation-to-tumor Ratio for Predicting Lymph Node Metastases in Part-solid Lung Adenocarcinomas from 1444 Patients.

DISCUSSION AND CONCLUSION

Actionable Take Away Message

- Solid portion diameter had a superior diagnostic performance than CTR in predicting LN metastasis in patients with part-solid lung adenocarcinomas of solid portion diameter ≤ 30.0 mm on CT.
- Solid portion diameter ≤ 6.0 mm: LN metastasis risk = 0.2%. LN dissection is generally unnecessary.
- Solid portion diameter > 7.3 mm: Sensitivity for LN metastasis reaches 95.6% – use this as a clinical alert threshold for selective LN dissection.

Future Direction for Research

- Multi-institutional study, integration model with AI

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