

# P1.135: Quantitative Vessel Tortuosity Predicts Survival in Patients with Resectable NSCLC Receiving Perioperative Chemoimmunotherapy

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## INTRODUCTION

- Despite improved outcomes with perioperative chemoimmunotherapy (chemo-IO) for patients with surgically resectable NSCLC, recurrence and survival rates remain heterogeneous.
- Current lack of clinically applicable biomarkers capable of predicting response and/or survival to help guide treatment decisions.
- Quantitative vessel tortuosity (QVT) captures structural abnormalities in the peritumoral vasculature responsible for immune cell trafficking, thus reflecting a key component of the tumor microenvironment that may play a critical role in response to chemo-IO.
- Our primary objective was to identify QVT features from pre-treatment CT scans associated with disease-free survival (DFS) and overall survival (OS) in patients with NSCLC undergoing perioperative chemo-IO prior to surgery

## METHODS

### Step 1: Patient selection and clinical data collection

- 121 patients with locoregional NSCLC who received neoadjuvant chemo-IO identified at the Cleveland Clinic Foundation
- Patient demographics (age, sex, race), tumor characteristics (stage, histology, PD-L1 expression), and survival outcomes collected for analysis
- Divided into **training (St; N = 61)** and **validation (Sv; N = 60)** cohorts for QVT analyses

## REFERENCES & ACKNOWLEDGEMENTS

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## DISCUSSION AND CONCLUSION

- QVT-RS associated with DFS in St (HR = 2.17, 95% CI: 1.32 - 4.5, P < 0.017) and Sv (HR= 2.12, 95% CI: 1.30 - 4.11, P = 0.03).
- QVT-RS associated with OS in St (HR = 2.42, 95% CI: 1.87-3.20, P < 0.01) and Sv (HR = 2.10, 95% CI: 1.12-3.90, P = 0.02).
- QVT-RS remained the only factor significantly associated with DFS and OS in multivariate analyses that included clinicopathologic factors (e.g., age, race, PD-L1 expression, and pathological response).

## RESULTS

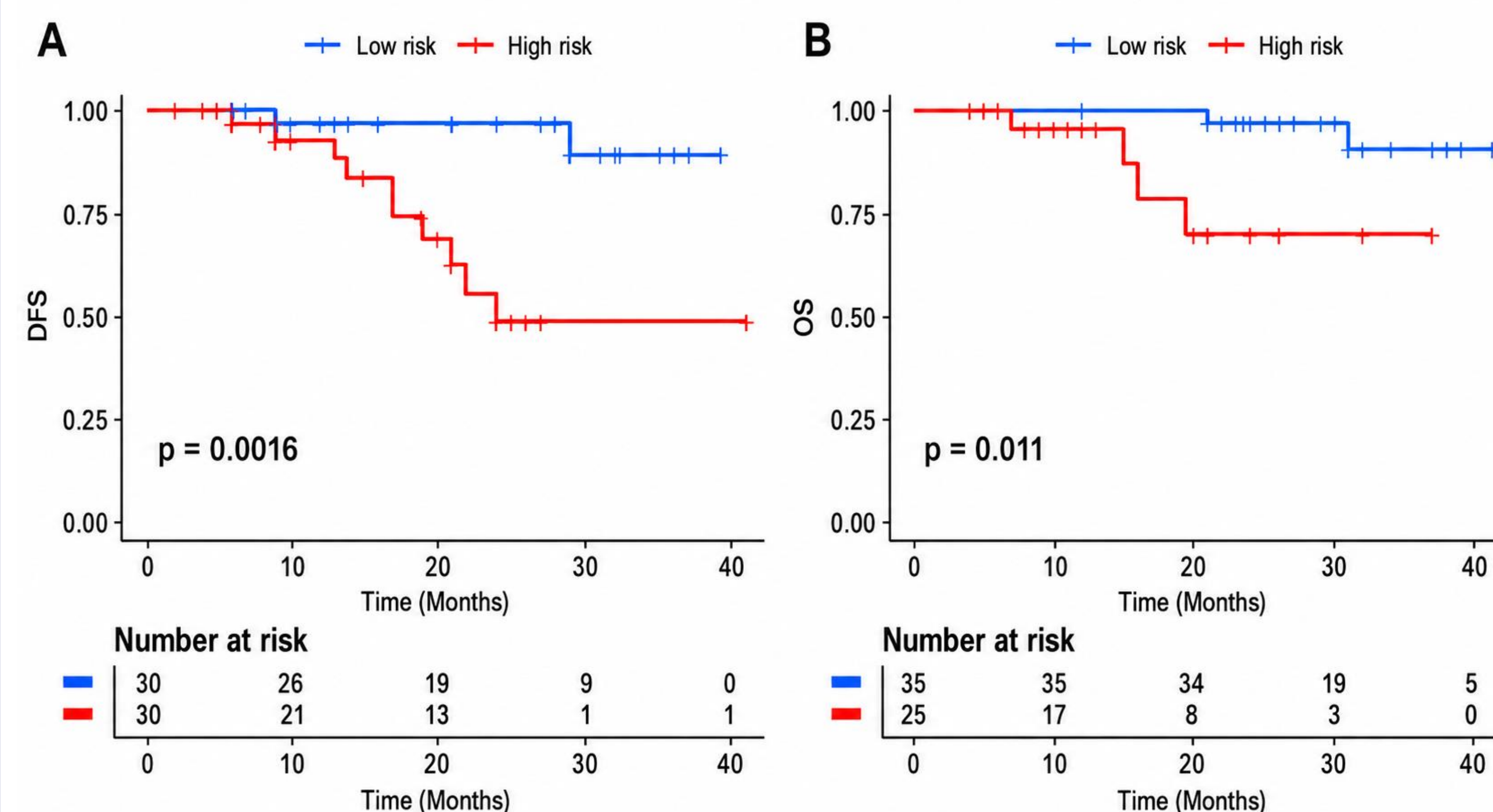


Fig. 2: Kaplan-Meier analyses demonstrated that QVT was strongly associated with DFS (A) and OS (B) in Sv, with significant differences between the high- and low-risk groups.

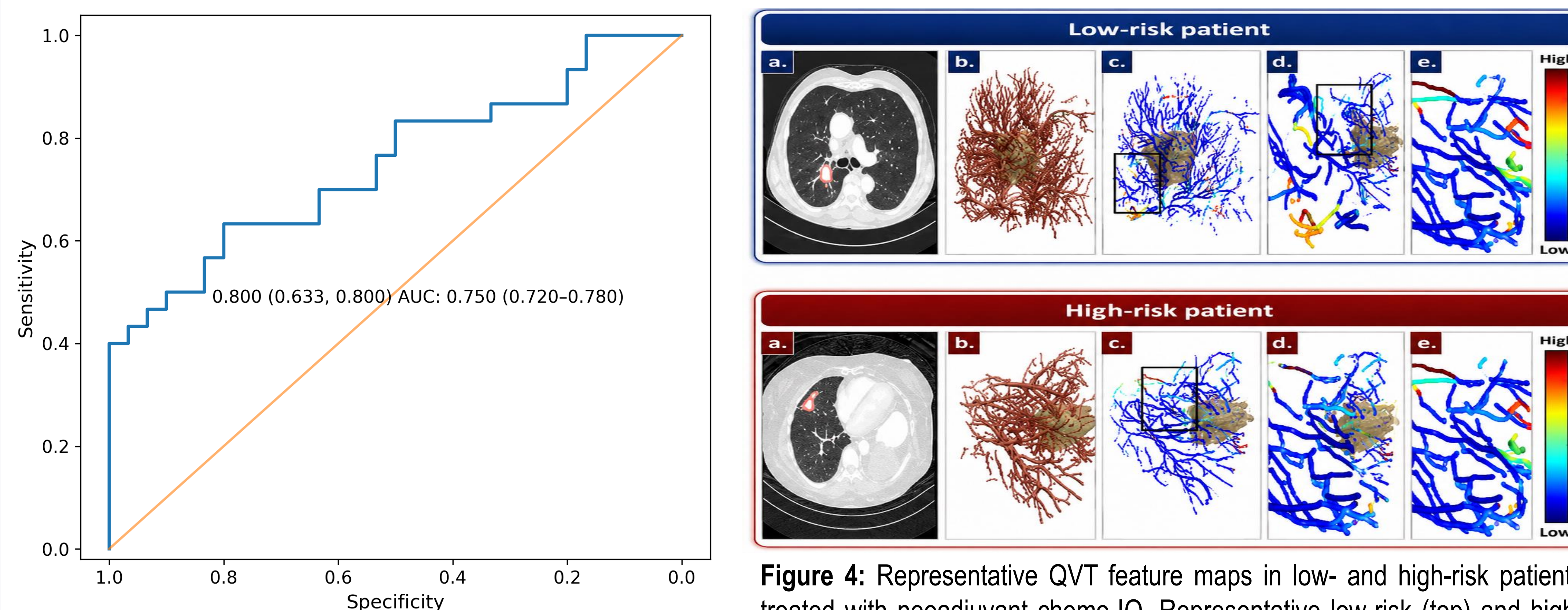


Fig. 3: Linear discriminant factor (LDA) demonstrated an AUC of 0.75 for predicting pathological complete response (pCR) in Sv.

### Step 2: Feature selection and analysis

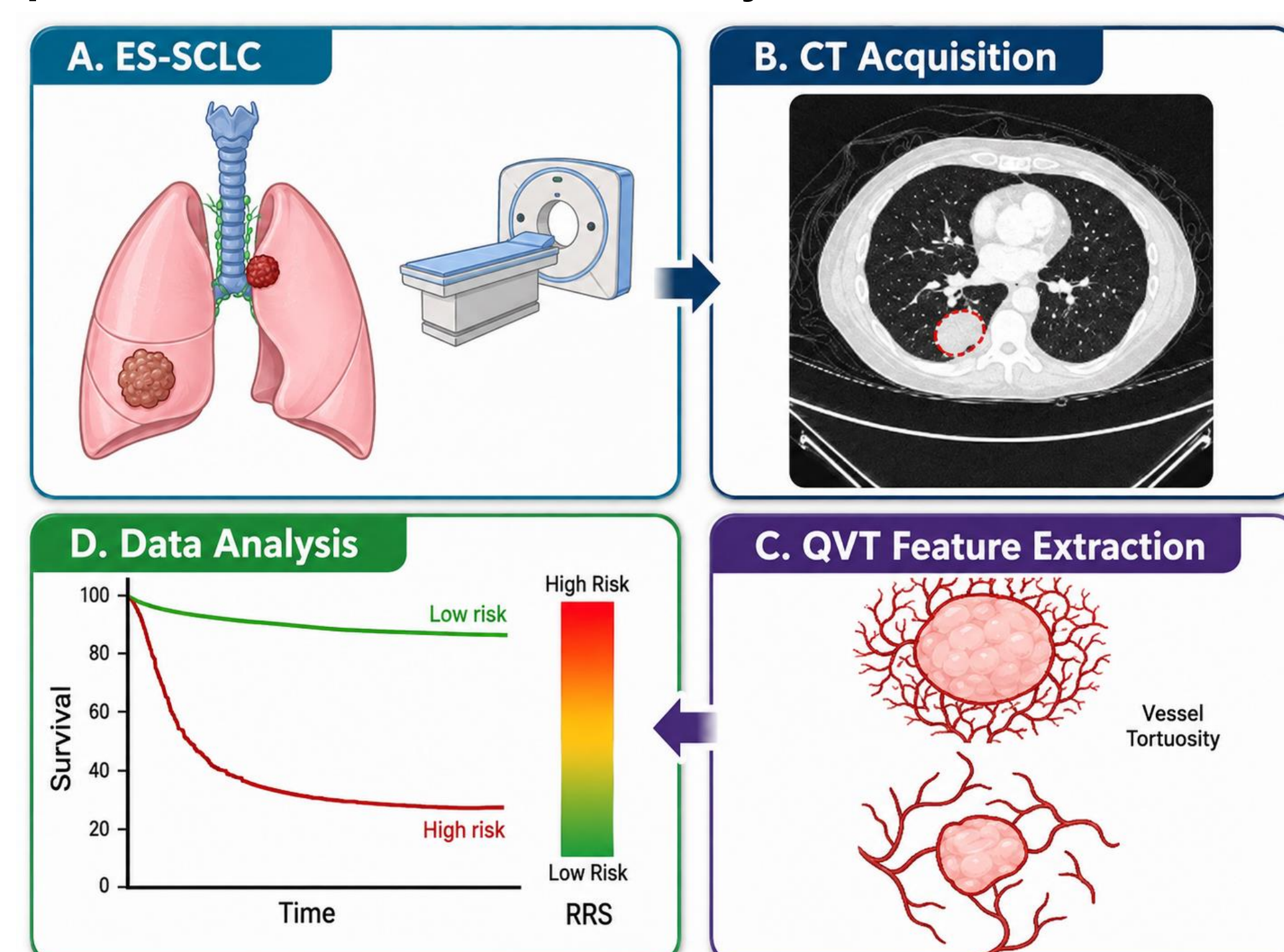


Fig. 1: (A) Patients with locoregional NSCLC who received neoadjuvant chemoIO identified. (B) Pre-treatment CT scans acquired and lung tumors (red) annotated. (C) Least absolute shrinkage and selection operator (LASSO) Cox regression model used in St to identify prognostic QVT features for DFS and OS to construct a QVT-based risk score (QVT-RS). (D) Patients stratified into high- and low-risk groups using the median QVT-RS in St. Prognostic performance evaluated using Cox regression and Kaplan-Meier survival analysis.