

Identifying an optimal 37-45-day interval to surgery to maximize pathological response after neoadjuvant chemoimmunotherapy in NSCLC

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INTRODUCTION

Neoadjuvant chemoimmunotherapy has transformed management for operable non-small cell lung cancer (NSCLC), yet the optimal interval to surgery (ITS) remains undefined. We evaluated the association between ITS and pathological response to identify a clinically favorable surgical window.

METHODS

This retrospective single-center study included 406 patients with NSCLC who underwent resection after neoadjuvant chemoimmunotherapy, with surgical intervals truncated at the 1st and 99th percentiles. The primary endpoint was major pathological response (MPR). Multivariable-adjusted restricted cubic spline analysis was used to identify a candidate surgical window, which was then tested using inverse probability of treatment weighting IPTW-weighted logistic regression after categorizing intervals into ≤ 37 days, 37-45 days, and ≥ 45 days.

RESULTS

The cohort had a mean age of 61.0 years; 86.7% were male, and the mean ITS was 49.08 days. Overall, 32.8% achieved pCR and 18.3% of patients attained MPR but not pCR. In multivariable-adjusted RCS analysis revealed a significant bell-shaped association (P for nonlinearity = 0.001), and the response curve peaked at 39.7 days. IPTW-weighted logistic regression showed that the (37-45 days) window was associated with higher odds of response than the ≥ 45 -day group (OR = 1.756, 95% CI: 1.025-3.008). This benefit was more pronounced in squamous cell carcinoma, high-intensity regimens (≥ 4 cycles).

CONCLUSION

In NSCLC patients receiving neoadjuvant chemoimmunotherapy, an ITS of 37–45 days was associated with a higher odd of achieving MPR. These findings suggest that a 37–45-day surgical window offers potential clinical benefits, warranting prospective validation.

DECLARATION

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Figure 1. Patient Selection Flowchart

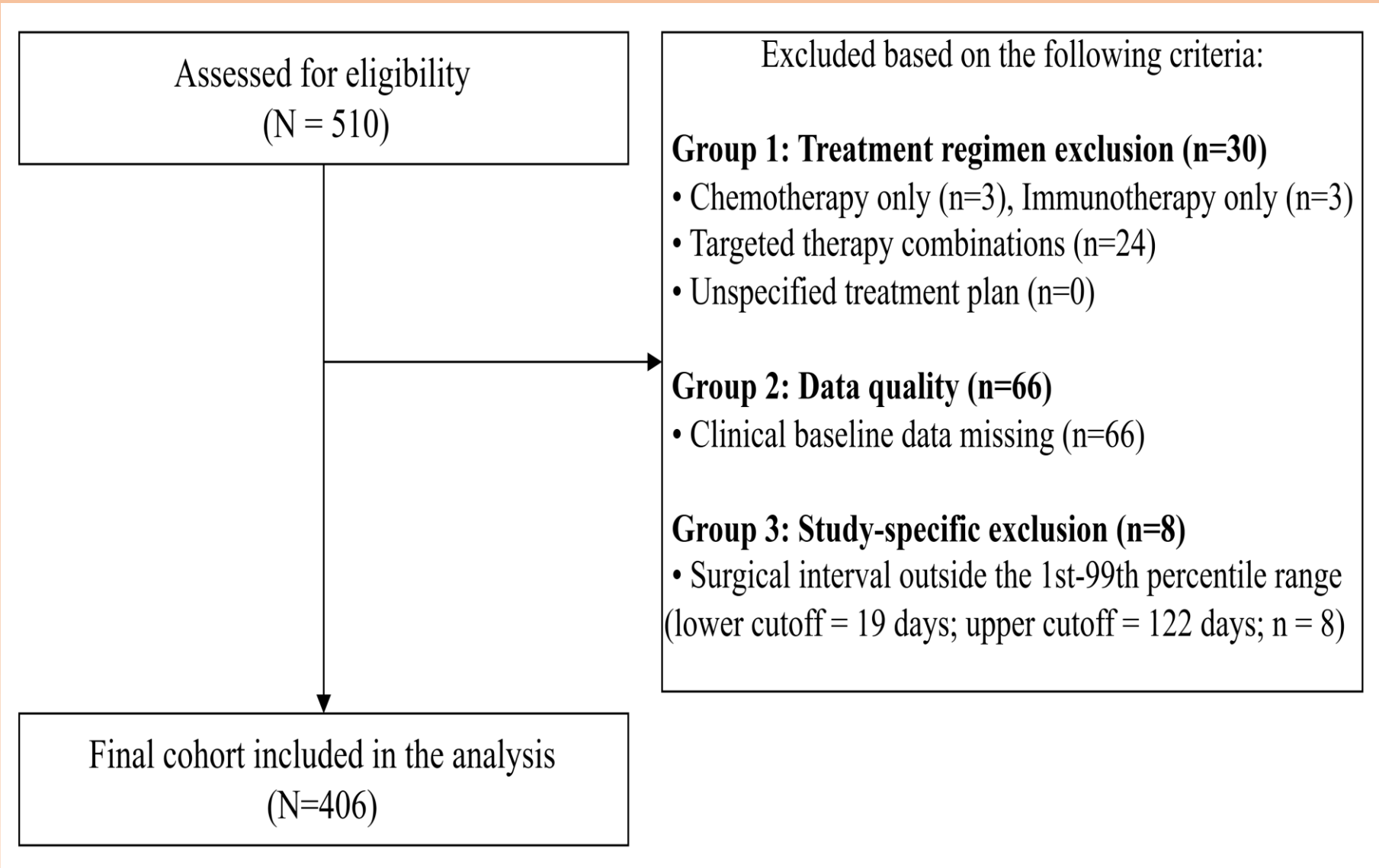


Figure 2. Pathological Response Composition

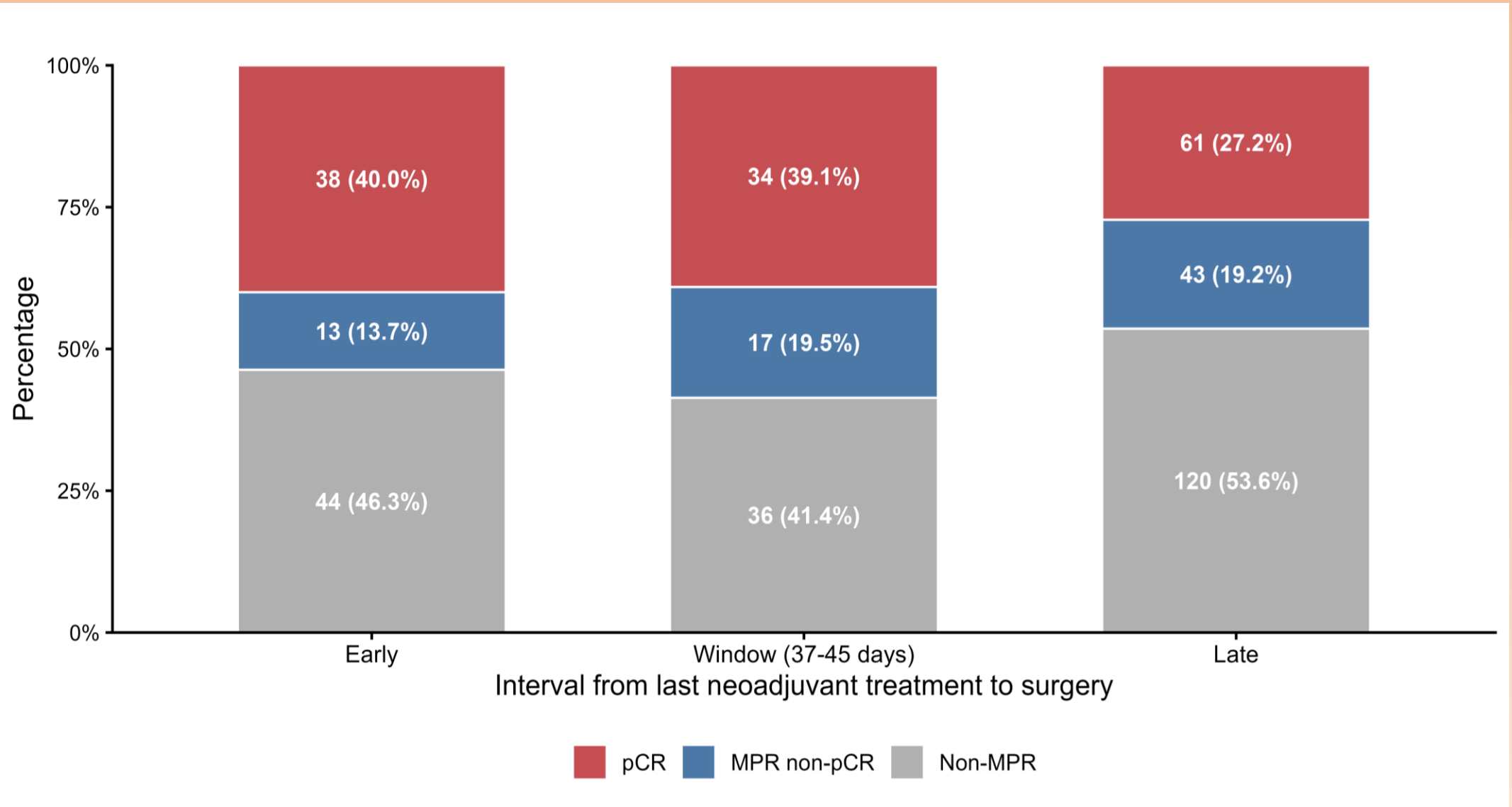


Figure 3. Restricted Cubic Spline Analysis of Surgical Interval and Pathological Response

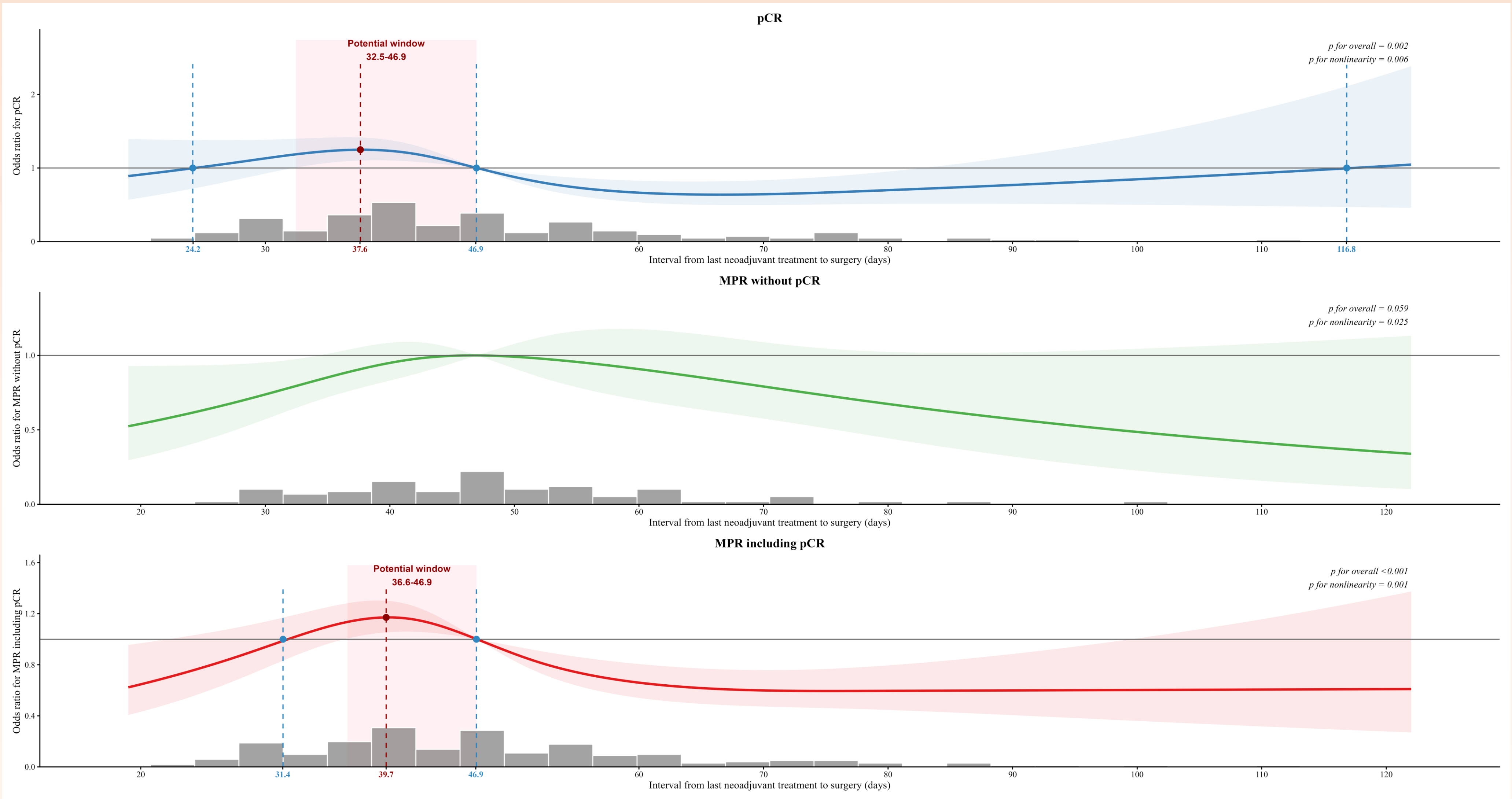


Figure 4. Covariate Balance Before and After Three-Group IPTW

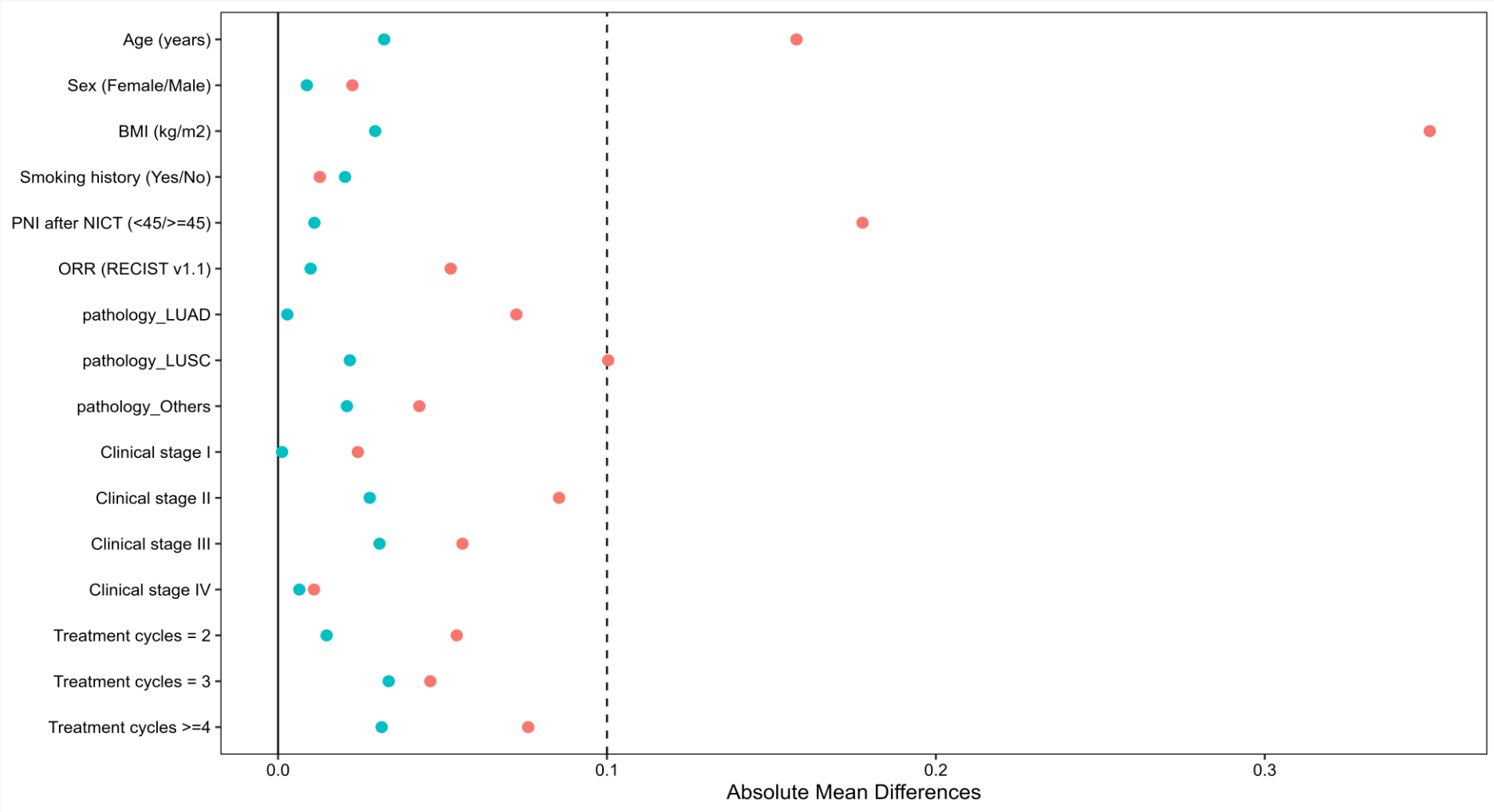


Figure 5. IPTW-Adjusted Forest Plot of Pathological Response

