

# Functional assessment and clinical staging of patients undergoing lung resection

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**Keywords:** cardiopulmonary function, lung cancer, lung resection, staging

Received: 9 August 2025; revised manuscript accepted: 23 September 2025.

Primary lung cancer remains the foremost cause of cancer-related mortality worldwide. Surgical resection continues to be the cornerstone of curative treatment in early-stage disease and plays an essential role in the multidisciplinary management of locally advanced stages.<sup>1</sup> Accurate preoperative clinical staging is critical in selecting the most appropriate therapeutic strategy—ranging from surgery to radiotherapy, chemotherapy, immunotherapy, targeted biological therapies, or multimodal combinations.<sup>2</sup> Equally important is a comprehensive functional assessment to identify patients who can safely undergo surgery and to appropriately stratify perioperative risk.<sup>3</sup>

This Special Collection highlights recent advancements in both clinical staging and functional evaluation of patients undergoing lung resections for primary or secondary malignancies, with direct implications for patient selection and perioperative management.

Bagrodia et al. investigated the role of preoperative physical activity monitoring using pedometers. Patients with higher daily step counts demonstrated better preoperative quality of life and functional resilience, although postoperative outcomes were unaffected. Clinically, this suggests that simple, low-cost activity programs may improve patient readiness and tolerance to surgery, potentially serving as an adjunct to prehabilitation in carefully selected individuals.<sup>4</sup>

Baum et al. demonstrated that preoperative FEV<sub>1</sub> and DLCO remain valuable predictors of postoperative complications, with DLCO showing particular strength. However, their limited accuracy for prolonged air leaks underscores the need for complementary parameters.<sup>5</sup> Expanding on this,

Towe et al. showed that alternative pulmonary function measures, such as FVC, may better stratify risk. Together, these studies suggest a shift from reliance on conventional parameters toward a more individualized, multiparametric risk assessment model that may influence guideline updates.<sup>6</sup>

Garcia-Cabo et al. reaffirmed EBUS-TBNA as the first-line tool for mediastinal restaging in NSCLC after induction therapy, but highlighted its suboptimal sensitivity and negative predictive value. For clinicians, this means that a negative EBUS result should not preclude surgical confirmation when treatment decisions depend on precise staging. The study reinforces the importance of combining minimally invasive and surgical approaches in staging algorithms.<sup>7</sup>

Li et al. evaluated CT-based multiparametric models to predict recurrence in stage I synchronous multiple primary lung cancers (SMPLC). Their decision-tree algorithm integrates radiologic features into a practical risk-stratification tool. If validated in larger cohorts, such non-invasive algorithms could refine surveillance intensity, tailor adjuvant strategies, and better inform surgical planning.<sup>8</sup>

Finally, Petrella et al. reviewed the evidence on cardiopulmonary reserve and surgical risk evaluation. Their synthesis integrates lung function testing, cardiac assessment, and perioperative risk factors into a clinically applicable framework, supporting personalized patient selection and perioperative optimization.<sup>9</sup>

In conclusion, the studies presented in this Special Collection collectively underscore the central role of accurate staging and functional assessment in

*Ther Adv Respir Dis*

2025, Vol. 19: 1–2

DOI: 10.1177/  
17534666251386201

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tailoring treatment for lung cancer patients. Together, they highlight how simple interventions (such as preoperative physical activity programs), advanced imaging-based algorithms, evolving pulmonary function parameters, and multimodal staging strategies can directly inform patient selection, perioperative management, and guideline-driven care. The overarching message is that individualized, evidence-based assessment—integrating functional reserve with oncologic staging—remains the foundation for optimizing outcomes in thoracic surgery. By framing these advances within a unified framework, this collection provides thoracic surgeons and multidisciplinary teams with practical tools to refine decision-making and improve patient-centered care.

### Declarations

#### *Ethics approval and consent to participate*

Not applicable.

#### *Consent for publication*

Not applicable.

#### *Author contributions*

**Francesco Petrella:** Conceptualization.

**Fabrizio Luppi:** Conceptualization.

#### *Acknowledgements*

None.

#### *Funding*

The authors received no financial support for the research, authorship, and/or publication of this article.

#### *Competing interests*

The authors declare that there is no conflict of interest.

#### *Availability of data and materials*

Not applicable.

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