Evaluating a Modified Di Maio Prognostic Scale in Non-Small Cell Lung Cancer Patients Undergoing Robotic-Assisted Pulmonary Lobectomy

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Background

- The **Di Maio prognostic scale** was originally developed for **advanced NSCLC** patients receiving systemic therapy. Its **role in surgical NSCLC populations remains unclear.**
- Pre-operative risk stratification may improve surgical counseling, peri-operative planning, and outcome prediction.

Objective

- To assess whether a **modified Di Maio (mDiM)** score can serve as a **pre-operative prognostic tool in NSCLC** patients undergoing **robotic-assisted pulmonary lobectomy.**

Methods

- A **retrospective single-center cohort** of **860** consecutive **NSCLC patients** undergoing **robotic-assisted pulmonary lobectomy** (2010–2025) was analyzed.
- A mDiM score based on **sex, performance status, histology, tumor size, nodal status,** and **metastasis status** was applied pre-operatively. Patients were stratified into **Best (mDiM<5)** and **Non-Best (mDiM≥5)** groups.
- **Overall survival** was assessed using **Kaplan–Meier** and **multivariable Cox regression** analyses **adjusted** for **age, sex, BMI, smoking status, FEV1%, DLCO%,** and **surgery year.**
- Time-dependent ROC analyses at 36 and 60 months evaluated model discrimination across thresholds 5–8.

Results

- The **binary cutoff of mDiM=5** provided the **strongest prognostic** discrimination, with an adjusted **HR=2.97 (95%[CI]=2.19–4.02, p<0.0001).**
- Higher thresholds **(mDiM ≥6-9)** produced attenuated discrimination due to increased **sampling noise** and **lower sensitivity.**
- **Median OS** was **94.1 months** for **Best** vs. **31.0 months** for **Non-Best**, with corresponding **OS** probabilities of **91.2% vs 75.8% at 36 months** and **79.0% vs 47.6% at 60 months.**
- At 60 months, model discrimination improved from **AUC_t = 0.64** (clinical covariates only) to **0.66** with the inclusion of the mDiM ≥5 grouping.

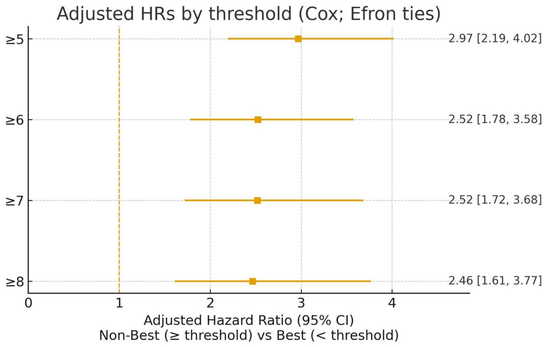

Figure 1. Adjusted hazard ratios for overall survival across mDiM thresholds, demonstrating **optimal prognostic discrimination at mDiM≥5.**

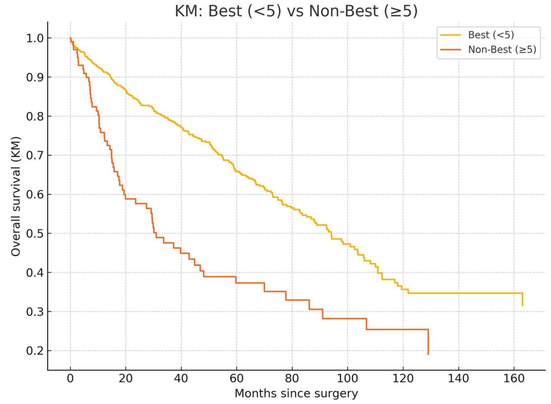

Figure 2. **Kaplan–Meier** analysis demonstrating **markedly reduced overall survival** in patients with **mDiM≥5** compared with **mDiM<5.**

Conclusion

- The mDiM score demonstrates **prognostic utility** in **surgically treated NSCLC** patients, **with mDiM≥5** identifying significantly **worse overall survival**.
- A simple dichotomic pre-operative classification provides clinically meaningful risk stratification and **improved prognostic discrimination beyond standard clinical variables**, supporting the broader applicability of the framework in surgical populations.
- Further prospective multi-institutional validation is warranted.

Limitations

- This study is limited by its retrospective single-center design and inclusion of a single-surgeon cohort, which may limit generalizability.
- Additionally, external validation is lacking, and selection bias may be present.

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