Factors and Outcomes Associated with Successful Minimally Invasive Pneumonectomy

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Introduction

Video-assisted thoracoscopic surgery (VATS) and robotic-assisted thoracoscopic surgery (RATS) are being increasingly used in complex lung resections, however outcomes associated with successful minimally invasive pneumonectomy (MIP) have not been well studied in the context of institutional minimally invasive lung surgery volume.

Hypothesis

Patients undergoing MIP at high volume minimally invasive lung surgery centers have improved survival compared to open pneumonectomy patients.

Methods

The NCDB was queried for patients who underwent pneumonectomy between 2010-2020. Outcomes were compared according to surgical technique (MIP, open, converted) and institutional minimally invasive lung surgery volume (low, mid, high) using logistic regression, Kaplan-Meier, and Cox proportional hazards analysis.

Results

- 6,138 patients from 905 facilities underwent pneumonectomy, with most undergoing open surgery (79.6%).
- Among 1,253 attempted MIP, 394 (31.4%) required conversion to open pneumonectomy.
- Neoadjuvant therapy was associated with lower risk of conversion (AOR 0.64, p=0.036), while surgery at non-high-volume centers was associated with higher conversion risk (AOR 3.96, p<0.001).
- Compared to open pneumonectomy, MIP was associated with reduced risk of death (HR 0.88, p=0.039), however conversion was associated with increased risk (HR 1.17, p=0.033).

Conclusion

Minimally invasive pneumonectomy may have clinical benefit over open pneumonectomy when conducted at experienced minimally invasive lung surgery centers, however careful patient selection is necessary as to not impact long-term outcomes.