



## 90-DAY MORTALITY: VATS VS THORACOTOMY

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### OBJECTIVE.

To determine the impact of the surgical approach on 90-day mortality, comparing treatment and intention-to-treat analysis in patients who underwent and anatomical lung resection for lung cancer in the national cohort by the Spanish Group of Video-assisted Thoracic Surgery (GEVATS).

### METHOD

The GEVATS of the Spanish Society of Thoracic Surgery (SECT) was established in May 2015, with a total of 33 Thoracic Surgery Departments participating. A total of 3533 anatomical lung resections were recruited from 20/12/2016 to 20/03/2018, including 1917 VATS (54.3%). To compare 90-day mortality those patients with a diagnosis other than lung carcinoma (448 patients, 12.7%) and those who underwent pneumonectomy (236 patients, 6.7%) or extended lung resection (165 patients, 4.7%), were excluded.

A double type of analysis was carried out, treatment and intention-to-treat, depending on the need of conversion from VATS to Open throughout the procedure. Different propensity score techniques were used to prove the consistency of our results. Finally, the sensitivity of our results to hidden bias was evaluated.

### RESULTS.

A total of 2721 patients met the inclusion criteria. VATS was the initial approach in 1911 patients (70.2%), representing the treatment group in the intention-to-treat analysis. However, 273 cases (14.3%) had to be converted to thoracotomy and, therefore, the VATS arm in the treatment analysis consisted of 1638 patients (60.2%).

Based on the treatment analysis, VATS was consistently associated to a lower 90-day mortality rate according to the average treatment effect (ATE) and average treatment effect on the treated (ATT) estimators, whatever the propensity score technique or algorithm used, with absolute risk reduction from 2% to 3% and relative risk reduction from 65% to 70%. However, in the case of ITT analysis, the still lower mortality after VATS was associated to non-significant ATE and ATT, in terms of absolute and relative risk reductions, in all the cases. A conditional logistic model after propensity score matching 1:1 adjusted by surgeon experience (seniority and VATS background) yielded similar results.

In the sensitivity analysis, the close to zero c-dependence values under which the conclusions still held (treatment analysis 0.135 and ITT analysis 0.09) meant a high sensitivity of the ATE estimator to hidden bias

## **CONCLUSIONS**

VATS can reduce 90-day mortality after lung resection. However, based on our intention-to-treat analysis and until upcoming evidence comparing converted VATS to straight thoracotomy, an effort should be made to optimize the beneficial effect of VATS on short-term mortality. In the analysis of hidden bias, we demonstrated that the treatment effect estimators were highly sensitive to unobservable confounders, which could only be overcome in a sufficiently large multicentre randomized trial.