The relevance of pleural adhesions for the short- and long-term outcome of lung volume reduction surgery

Objective: Pleural adhesions (PLA) have been shown to be a risk factor for air leak after lung volume reduction surgery (LVRS) – its relevance for the lung functional outcome (LFO) remains unclear. We analyzed our LVRS cohort for the relevance of PLA for the short-term outcome prolonged air leak (PAL) and for the long-term outcome lung function.

Methods: Retrospective observational cohort study with 187 consecutive patients who underwent LVRS from January 2016 to December 2019. Pleural adhesions (PLA) were defined as relevant, if they were distributed extensively at the dorsal pleura or at least at two areas including the dorsal pleura or at least extensively at the mediastinal pleura. In patients with bilateral emphysema, bilateral LVRS was preferably performed.

Objectives were to quantify the association of PLA and rate of PAL (chest tube > 7 days), the association of PLA with postoperative infectious exacerbations (PIE) and with FEV1 three months postoperatively. The associations were quantified with odds ratios for binary outcomes, and with between-group differences for the continuous outcomes. To account for missing observations, 100-fold multiple imputation was used.

Results: PLA were found in 46 of 187 patients (24.6%). There was a 32.6% rate of PAL (n=61), chest tube time was mean 7.84 days. 94 LVRS were unilateral (50.3%), 93 bilateral.

There was evidence for an association between PLA and the rate of PAL (odds ratio (OR) 2.83, 95% confidence interval (CI) from 1.36 to 5.89; p = 0.006). There was no evidence for an association between PLA and PIE (OR 1.11, 95% CI from 0.5 to 2.45; p = 0.79). FEV1 increased from a median of 28 to 35 within three months postoperatively. There was no evidence for an association between PLA and FEV1 (estimate -1.52; 95% CI from -5.67 to 2.63; p = 0.47). Both unilateral and bilateral LVRS showed significant postoperative improvements in FEV1 (delta 8.43 units (27%), 95% CI: 3.66 to 13.12, p = 0.0006 and 7.87 units (28%), 95% CI: 4.68 to 11.06, < 0.0001) and reduction in RV (delta -33.9 units (15%), 95% CI: -56.37 to -11.42, p = 0.003 and 34.9 (15%), 95% CI: -52.57 to -17.22, p = 0.0001).

Conclusions: Patients should be aware of the prolongation of their hospitalization due to PLA. However, there might be no relevant influence of PLA on LFO. We continue surgery even when facing relevant PLA during unilateral LVRS. In bilateral LVRS, we consider only unilateral LVRS in case of relevant PLA on the second side.

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