Pneumonectomy: what are the risk factors for major morbidity and mortality?

Compared to lobectomy or sublobar resections, pneumonectomy carries a higher risk of major morbidity and mortality. In a large database, predictors for mortality and adverse events were identified.

Methods and methods
Using the General Thoracic Surgery Database of the Society of Thoracic Surgeons, 1,306 patients who underwent pneumonectomy in 2002-2007 were identified from 80 participating centres. 39 patients were excluded and 1,267 patients were analysed by multivariate analysis, correcting for missing data. Mortality was defined as death within 30 days of the procedure or during the same hospitalisation.

Results
Overall operative mortality was 5.6% (71 patients). In general, 50.6% of patients had one or more postoperative events. Major complications occurred in 30.4% (atrial arrhythmias: 20.2%; ventricular arrhythmias: 1.0%; reintubation: 5.6%; pneumonia: 4.7%; acute respiratory distress syndrome: 3.1%; tracheostomy: 2.5%; ventilation for >48 h: 2.1%; sepsis: 1.7%; reoperation for haemorrhage: 1.5%; bronchopleural fistula: 0.8%; pulmonary embolus: 0.8%; myocardial infarction: 0.8%; empyema: 0.6%; neurological event: 0.6%). Multiple logistic regression analysis revealed age, male sex, benign disease, type of pneumonectomy, congestive heart failure, pre-operative forced expiratory volume in 1 s % predicted, and induction therapy as significant predictors for major peri-operative events.

Conclusion
After pneumonectomy, specific risk factors for mortality and major morbidity can be defined.

Competing interests
None declared.

Editorial comment
Due to its profound haemodynamic and functional consequences, pneumonectomy is often considered a disease in itself. The present study analyses a large group of patients undergoing pneumonectomy who were extracted from a national database. Inclusion in this database is voluntary and most participating surgeons are board-certified thoracic surgeons working in dedicated centres, which may induce a certain bias. Specific predictors for mortality and major morbidity were identified and these are generally consistent with previous studies. As several reports demonstrate an increased operative risk in patients undergoing pneumonectomy after induction therapy, special attention was given to the latter group. In the case of malignant disease induction, chemotherapy was found to be a significant risk factor and, more specifically, in patients with lung cancer, induction chemoradiation was an independent predictor. In contrast to other studies, laterality of the procedure (right or left) did not influence outcome. So, after induction, chemoradiation pneumonectomy should only be considered in highly selected patients with a low-risk profile.

Regarding the type of pneumonectomy, extrapleural procedures, mostly performed for malignant mesothelioma, and completion pneumonectomy carried an increased risk, as well as interventions for benign disease. Smoking status had no influence on the occurrence of severe complications, although it may influence long-term prognosis, as previously demonstrated [1]. Quality of life was not analysed in the present study but, as may be expected, recent observations demonstrate that pneumonectomy has a greater impact compared with less extensive resections [2]. Major limitations of the present study include the lack of verification of the data, voluntary inclusion and a high percentage of missing data. However, it provides a valuable analysis of risk factors that should be considered when a pneumonectomy is anticipated.

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References