Bronchoscopic lung volume reduction: an alternative to repeated lung volume reduction surgery†

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We have read with great interest the paper of Kostron *et al*. [1]. The authors retrospectively evaluated the effects and outcomes of repeated lung volume reduction surgery (Re-LVRS) in 22 patients no longer benefiting from their initial bilateral LVRS. Lung function and Medical Research Council score improved significantly for up to 12 months after Re-LVRS, with results similar to those after initial bilateral LVRS. The following points should be discussed.

Firstly, the rate of 90-day mortality and morbidity reported by authors after Re-LVRS was 0 and 77%, respectively. Re-LVRS versus initial LVRS presented higher incidence of overall morbidity (45 vs 77%; $P = 0.092$) and of surgical revisions (9 vs 32%; $P = 0.125$) suggesting that Re-LVRS could be more a 'high-risk procedure' than initial LVRS.

LVRS has a considerable morbidity (20–30%) and mortality (7.9%) that could increase after Re-LVRS [2]. Thus, we wonder whether these patients were reviewed for less invasive procedures as bronchoscopic lung volume reduction (BLVR) using endobronchial one-way valves (EBVs) (Zephyr TM EBV; Pulmonx, Inc., Redwood, CA, USA) before proceeding with Re-LVRS.

EBV treatment is based on the same physiological effects of LVRS but with the potential advantages of less morbidity and mortality [3]. Also from a technical point of view, EBV treatment could be a valid alternative to surgery especially in patients undergoing initial LVRS by the open approach. The adhesions related to previous thoracotomy could make a thoracoscopic Re-LVRS particularly challenging and conversion to thoracotomy may not be tolerated by these frail patients. In the present series, the initial LVRS was performed by thorascoscopy in all patients but, one and in theory, it allowed one to perform Re-LVRS by thoracoscopy. Despite all this, in 3/22 (18%) cases, a conversion to thoracotomy was required.

Secondly, 4/22 patients were treated with LVRS for tissue-diagnosis and treatment of newly diagnosed intrapulmonary nodules and 1/22 during elective cardiac surgery. In theory, 5/22 (22.7%) patients did not have a compromised respiratory function as observed in the other 15/22 (77.3%) patients for whom the indication for Re-LVRS was the decline of respiratory function to the pre-LVRS level. That could influence the results.

Thirdly, pulmonary rehabilitation is an integral part of LVRS treatment. Since the patients were treated in a time period of >10 years, they could not have received the same rehabilitation programme with different effects on outcomes. Yet, spirometric data significantly improved 3 months after re-LVRS but decreased later. Thus, the early beneficial effects could be mainly related to pulmonary rehabilitation rather than surgery.

Finally, BLVR with EBV should be reviewed as the possible treatment in selected patients who have lost the benefits from previous LVRS. The potential advantages compared with that of surgery are the less invasiveness and the feasibility independently if initial LVRS were performed by open or thoracoscopic approach. Obviously, an accurate selection of patients based on the presence of complete interlobar fissures and of heterogeneous emphysema is crucial for the success of EBV treatment [4, 5]. We congratulate the authors again on their ongoing work to improve our understanding of management of end-stage emphysema.

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Considerations about the ability of computed tomography to predict the clinical stage of thymoma†

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In the November 2015 issue of the *European Journal of Cardio-Thoracic Surgery*, Dr Zhao reported on the ability of computed tomography (CT) in predicting the Masaoka-Koga stage of thymoma. On a large cohort, the author found a significant correlation between some CT characteristics of thymoma and clinical stage [1]. Currently, there is an increasing interest in the identification of tumour characteristics at preoperative imaging (namely, CT and magnetic resonance), which may help to predict the clinical stage of thymoma, with the aim to determine the optimal treatment strategy [2–4]. Indeed, Masaoka-Koga stage III tumours require induction therapy in order to obtain a complete surgical resection that represents the main goal of treatment to improve prognosis [5]. Unfortunately, as stated by Dr Zhao, the major limitation of his retrospective study is the use of different CT scanners without standardization in CT protocols, a condition that can significantly affect the results of the study [1]. For instance, the use of different slice thicknesses (up to 10 mm) affects the evaluation of morphological features (e.g. infiltration of surrounding fat and neighbouring organs or vessels) because it causes a different amount of partial

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