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Editorial

Hope for Patients with Homogeneous Emphysema?

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Abbreviations: chronic obstructive pulmonary disease, **COPD**; lung volume reduction surgery, **LVRS**; National Emphysema Treatment Trial, **NETT**

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Introduction

Chronic obstructive pulmonary disease (COPD) is among the leading causes of disease burden, morbidity and mortality worldwide. In an advanced stage, COPD is a highly symptomatic disease with severe dyspnea on mild exertion leading to inability to participate in social life, depression and anxiety. Therapeutic options for patients with advanced emphysema are limited and focus on minimizing symptoms and disease progression.

Despite optimal pharmacologic therapy and rehabilitation, the majority of patients with significant reduced lung function still have symptoms that dramatically impair their quality of life. For these patients, lung volume reduction may present an additional therapy that improves lung elastic recoil, reduces dynamic hyperinflation and makes respiratory muscles more effective. Lung volume reduction surgery (LVRS) was the first approach to address hyperinflation reduction. This surgical procedure is associated with positive outcomes, particularly in

patients with upper lobe predominant emphysema, but it also carries significant mortality. Overall, the 90-day mortality following LVRS was shown to be 7.9% in the National Emphysema Treatment Trial (NETT).¹ Particularly patients who were characterized by a forced expiratory volume in 1 second $\leq 20\%$ and either a homogeneous distribution of emphysema or a carbon monoxide diffusing capacity $\leq 20\%$ were at high risk of death with a 30-day mortality rate of 16%.² These findings stimulated the search for alternative treatment approaches with comparable physiological effect but less attendant risk.

In the last 15 years, less invasive techniques of endoscopic lung volume reduction have been developed to achieve lung volume reduction with a potentially better risk profile thus extending the therapeutic spectrum for patients with advanced emphysema. Endoscopic valve therapy and coil therapy, as best studied methods, are now mentioned as additive therapy in selected emphysema patients in the Global Initiative for Chronic Obstructive Lung Disease recommendations.³ Both techniques have been shown to be effective in patients with heterogeneous and homogeneous emphysema, even if greater benefits were observed in patients with heterogeneous emphysema distribution.

Valipour et al demonstrated improvements in lung function, exercise capacity and quality of life following valve therapy in selected patients with homogeneous emphysema and absent interlobar collateral ventilation.⁴ Klooster and colleagues confirmed the efficacy of coil therapy which can also be effectively used in patients with significant interlobar collateral ventilation, in a small cohort of homogeneous

emphysema patients.⁵ In the current issue of this journal, [Marchetti and colleagues](#)⁶ focused on the efficacy of endoscopic coil therapy in patients with homogeneous emphysema distribution. They evaluated individuals who received bilateral coil therapy in previously reported trials and compared them to individuals who underwent LVRS within NETT. Six months following endoscopic or surgical intervention, there was a significant decrease of hyperinflation compared to medical therapy that continued to be exhibited at 12 months. The magnitude of the decline in residual volume was greater in patients who underwent LVRS, but 6-minute-walk test improvement was shown to be greater in the coil therapy group. Furthermore, coil therapy and medical treatment groups both showed an increased survival compared to the surgical intervention group at 1 year. These findings demonstrate that coil therapy may benefit patients with homogeneous emphysema for whom few other options are available and may be a better alternative than LVRS.

However, it must be acknowledged, that in this trial, coil therapy and LVRS from various studies were compared to each other. Despite precise matching of individuals, some baseline parameters were not

controlled. Furthermore, it must be kept in mind, that in NETT, patients were enrolled between 1998-2002 and since that time the surgical approach, particularly the surgical access (minimally invasive versus sternotomy/thoracotomy) and the procedure (traditional resectional LVRS versus lobectomy versus non-resectional lobectomy), may have been optimized. Therefore, the comparison of endoscopic approaches to NETT LVRS must be considered with caution. The surgical approach for the treatment of severe heterogeneous or homogeneous emphysema must be reevaluated.

Nevertheless, the current results demonstrate the extended therapeutic spectrum for patients with advanced homogeneous emphysema. Different minimally invasive endoscopic approaches with a low risk profile and whose efficacy depends on patient selection criteria (e.g., collateral ventilation, degree of hyperinflation), are available. For successful interventional emphysema treatment, patient selection is crucial and should be performed within the context of a multidisciplinary team including pulmonologists, radiologists and thoracic surgeons.

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