



## Editorial

Endobronchial Valve Therapy in Prolonged Air Leak<sup>☆</sup>

## Tratamiento con válvulas endobronquiales en la fuga aérea prolongada

Javier Flandes Aldeyturriaga

Servicio de Bronoscopias y Neumología Intervencionista, Hospital Universitario Fundación Jiménez Díaz, Madrid, Spain

Persistent air leak (PAL) is the most common complication following lung resection.<sup>1,2</sup> It lengthens hospital stay and increases post-surgical morbidity and mortality due to the increased risk of empyema, fever or pneumonia.<sup>4</sup> It can contribute to respiratory failure, limit activity, increase the time and costs of hospitalization and add to the risk of hospital-acquired infections.<sup>1</sup>

PAL is defined as prolonged air leak caused by an alveolopleural fistula lasting more than 7 days.<sup>1</sup> Although the length of evolution described in the literature varies, the finding of air leak on day 5 post-surgery is considered as a "significant air leak". If the air leak is continuous or occurs during inhalation or exhalation and presents with subcutaneous emphysema or respiratory failure, it normally becomes persistent.<sup>1,5</sup> An alveolopleural fistula is the abnormal communication between the pulmonary parenchyma distal to a segmentary bronchus and the pleural space.<sup>3</sup> After surgery, it may be caused by delayed healing of the lung surface, due mainly to underlying parenchymal disease.<sup>1</sup> For this reason, PAL is more common after surgery for secondary spontaneous pneumothorax than after primary pneumothorax. An incidence of around 20% has been reported.<sup>1</sup>

Standard treatment of PAL is generally conservative, with continuous chest drainage. If the condition prolongs over time, surgical reintervention can be considered as a second option. This procedure can be burdensome in terms of morbidity, does not always guarantee a solution, and in some cases the problem may even be aggravated if the already diseased parenchyma is exposed to more injury.<sup>1</sup> The most common surgical techniques currently available for treating this disease are further resection of the lung parenchyma at the site of the anatomical defect, reinforcement of sutures with bovine pericardium, pleurectomy, pleurodesis with autologous blood patches or other chemical agents such as fibrin sealant, sponges, ethanol, trichloroacetic acid, bronchial blockers or cautery using a fiberoptic bronchoscope.<sup>2</sup> The wide range of therapeutic options indicate that no single approach is fully effective, and this has led to the introduction of less invasive approaches such as endobronchial valves, which provide shorter recovery

times and allow the patient to regain autonomy and independence faster.

Endobronchial valves designed to limit airflow to the distal parts of the lung<sup>5</sup> were initially indicated for reducing lung volume in emphysema, but they have been shown to be extraordinarily effective in the treatment of PAL.<sup>2</sup> They are inserted by means of a flexible bronchoscope in the segment or subsegment in which the leak has been located<sup>2</sup> by previous exploration of the lung, generally with occlusive balloon, pleural pressure measurement, or a Chartis system. Placing the valve in the bronchus and blocking the segment accelerate closure of the parenchymal defect by reducing airflow through the leak, since it is this airflow that helps perpetuate the fistula.<sup>4</sup> Valves are usually removed about 6 weeks after resolution of the leak, but they may be removed earlier if there are signs of migration, infection or significant hemoptysis.<sup>2</sup> One of the side effects of valve treatment may be the development of new or increased dyspnea, normally caused by atelectasis of the excluded lobe, and mainly observed in patients with complete fissure on CT, but it resolves quickly and easily after valve removal.<sup>3</sup>

Valve treatment is effective, well tolerated and is an easily reversible, minimally invasive option<sup>4</sup> with little associated morbidity that should be considered before attempting resolution by surgery. More than 5 years ago, in 2009, Travaline reported an improvement rate of 93% after valve treatment, of which 48% had complete air leak stoppage.<sup>4</sup> Since then, several papers have appeared, but the study of Dr Cordovilla and her team is the first series published in Spain.

This paper, published here, adds to the sum of evidence on the effectiveness of this new treatment option, and raises interesting new questions on the direction of future research, such as the investigation of predictive factors for treatment failure and how prior identification of these will improve the selection of candidates for treatment, as well as defining the observation time required before considering the treatment ineffective and moving on to surgical reintervention.

Dr Cordovilla's series is small, and prospective trials in this area are clearly needed for defining more accurately the clinical circumstances and indications for this procedure.<sup>4</sup> Nevertheless, it is already clear that recently developed interventional bronchoscopic techniques, such as the placement of endobronchial valves in PAL, represent a new and advantageous treatment option that is rapidly becoming more widely accepted.<sup>1</sup>

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E-mail address: flandes@fjd.es

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