INTRODUCTION

Asthma is a chronic respiratory disease, characterised by airway inflammation and bronchial hyperresponsiveness, leading to airway smooth muscle contraction. Bronchial thermoplasty (BT) is an innovative intervention for asthma that delivers controlled thermal energy to the airway wall during a series of bronchoscopy procedures. Clinical trials have showed the procedure is safe and produces better clinical outcomes in patients with severe asthma refractory to medical therapies. Besides, it is associated with long-term improvement in quality of life and less healthcare need.¹

OBJECTIVES

The BT efficacy was usually evaluated using clinical findings and there are few studies in literature appraising the imaging role on this procedure’s assessment.² As multi-detector computed tomography (MDCT) is an imaging modality that provides data on regional lung function, air trapping and bronchial wall thickening, the objective of this study was to evaluate the role of high-resolution CT findings in the assessment of the BT efficacy.

METHODS AND MATERIALS

This study retrospectively analysed the multi-detector CT exams of 26 patients with severe persistent asthma, according to the GINA criteria, who underwent this imaging modality before and one year after the BT. Each CT exam had two protocols: one at full inspiration (total lung capacity) and one at the end of a normal expiration (functional residual capacity). The CTs were evaluated using a software for segmented images from the chest wall, mediastinum, diaphragm and airways, whereas automated segmentation of the right and left lungs from the chest wall and mediastinum was performed.

RESULTS

Total lung volume (TLV) and attenuation of all voxels as the voxels included in the lung segmentation were calculated and a mean lung density (MLD) histogram created. CT air trapping was defined as the percentage of voxels in expiratory CT with an attenuation inferior to -856 HU and the Expiration/Inspiration (E/I) Index was obtained by the division of the MLD of these protocols. Obstruction was defined as the percentage of low-attenuation areas below -950 HU on inspiratory CT.

CONCLUSIONS

Bronchial thermoplasty is a novel treatment for severe asthma that determines an improvement in the quality of life and less healthcare needed. Our study showed that high-resolution computed tomography is able to demonstrate an improved respiratory pattern after bronchial thermoplasty. There was a decrease in the median values of TLV (P=0.018), E/I Index (P= 0.005) and percentage of air trapping (P=0.001) and a raise on the mean lung density (P = 0.00).

References