



# Evaluation of bronchial wall thickness in asthma using magnetic resonance imaging

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**Magnetic resonance imaging of the lung using sequences with ultrashort echo times is a radiation-free alternative to computed tomography to assess bronchial thickness in asthma, and will help improve the management of severe asthma** <https://bit.ly/3fGLE4B>

**Cite this article as:** Benlala I, Dournes G, Girodet P-O, *et al.* Evaluation of bronchial wall thickness in asthma using magnetic resonance imaging. *Eur Respir J* 2022; 59: 2100329 [DOI: 10.1183/13993003.00329-2021].

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This article has supplementary material available from [erj.ersjournals.com](http://erj.ersjournals.com)

Received: 3 Feb 2021  
Accepted: 20 May 2021

## Abstract

**Background** Bronchial thickening is a pathological feature of asthma that has been evaluated using computed tomography (CT), an ionising radiation technique. Magnetic resonance imaging (MRI) with ultrashort echo time (UTE) pulse sequences could be an alternative to CT.

**Aims** The primary aim of this study was to measure bronchial dimensions using MRI-UTE in asthmatic patients by evaluating the accuracy and agreement with CT, by comparing severe and non-severe asthma and by correlating with pulmonary function tests.

**Methods** We assessed the bronchial dimensions of wall area (WA), lumen area (LA), normalised wall area (WA%) and wall thickness (WT) by MRI-UTE and CT in 15 patients with non-severe asthma and 15 age- and sex-matched patients with severe asthma (NCT03089346). Accuracy and agreement between MRI and CT was evaluated using paired t-tests and Bland–Altman analysis. Reproducibility was assessed using the intra-class correlation coefficient and Bland–Altman analysis. Non-severe and severe asthmatic parameters were compared using t-tests, Mann–Whitney tests or Fisher's exact tests. Correlations were assessed by Pearson or Spearman coefficients.

**Results** LA, WA% and WT were not significantly different when measured by MRI-UTE and CT, with good correlation and concordance. Inter- and intra-observer reproducibility was moderate to good. WA% and WT were both higher in patients with severe asthma compared to non-severe asthma. WA, WA% and WT were all negatively correlated with forced expiratory volume in 1 s.

**Conclusions** We have demonstrated that MRI-UTE is an accurate and reliable radiation-free method to assess bronchial wall dimensions in asthma, with enough spatial resolution to differentiate severe from non-severe asthma.