Quantification of CT bronchiectasis and its relationship to ventilation in cystic fibrosis

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Structural lung abnormalities and impaired pulmonary function are key facets of respiratory disease in cystic fibrosis (CF). Over the last decade, CT and the multiple breath washout (MBW) technique have been extensively investigated and validated as clinical and research tools to measure their severity. However, little is known about the relationship *between* the structural and functional aspects of CF lung disease. This may in part be due to limitations inherent to visual CT scoring: in particular, the difficulty of quantification and the combined contribution of a variety of abnormalities.[1 2] As a consequence, the concordance between lung structure and function in CF varies across studies, leading to uncertainty in how best to monitor and treat the disease.[3–8]

In *Thorax*, Verbanck and colleagues present a novel method of quantifying bronchiectasis on CT, based on counting airway segments.[9] In their study, they compare the number of segments with bronchiectasis (n_{BE}) to measures of ventilation heterogeneity from MBW, in both CF and non-CF bronchiectasis. They report that lung clearance index is significantly associated with n_{BE} in both diseases. Interestingly, they also report that n_{BE} is associated with convection-specific measures of ventilation heterogeneity from MBW: curvilinearity and Scond.[10] Since bronchiectasis visible on CT predominantly consists of conducting airways,[11] these results are consistent with physiologic expectations and thus are a plausible demonstration of the direct impact of structural lung disease on pulmonary function.

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There are still many unresolved questions regarding structure/function relationships in CF. Longitudinal data are required in order to confirm the findings in this study, ideally including a paediatric population. In addition, defining airways as either bronchiectatic or not may be overly simplistic. Fully quantitative assessments of bronchoarterial diameters have been performed in other studies, and may offer a more complete picture of airways disease, at the cost of analysis complexity.[12] Furthermore, bronchiectasis is only one component of CF structural lung disease: the contribution of trapped air, mucous plugging, and so on, as well as bronchiectasis on pulmonary function must be considered.[4 13 14] Nevertheless, the study by Verbanck *et al* is an important step towards marrying lung structure and function in CF.

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