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Title: Significant lung damage revealed at early chest computed tomography is related to subsequent pseudomonas (PsA) colonization in children with cystic fibrosis

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Body: Background: Chest computed tomography (CT) has been recognized to be superior to FEV₁ in monitoring progression of lung disease in children with cystic fibrosis (CF). To our knowledge, it has never been investigated if CT can predict a subsequent PsA colonization. Objective: to investigate if abnormalities on CT in CF schoolchildren PsA free is related to the risk of PsA infection in the following 6 years. Methods: CT scans routinely performed in 80 pediatric CF patients in a single center were scored using CF-CT scoring system. All patients had ≥4 sputum cultures/year for 6 years. Chronic PsA colonization was defined as ≥3 positive sputum cultures in the same year. One-way ANOVA was used to determine mean difference in CF-CT score according to PsA status at baseline and after 6 years. Results: mean age and FEV₁ at time of CT were respectively 8.2 years and 83.3% predicted. At baseline, 66.3% patients were PsA free, 23.7% had episodic PsA, 10% had chronic PsA. Six years later, 13 of patients PsA free or episodically colonized at baseline became chronically infected with PsA (group A) and 59 patients remained PsA free or had occasional positive sputum (group B). Children in group A had a significantly worse CF-CT score at baseline (Mean 19, SD 9.1) than patients in group B (Mean 10, SD 9.1), F = 12.1, p < 0.001. Significant differences between groups were found for bronchiectasis subscore (Mean 20.6% and 11.7% respectively; F 14.9, p < 0.001). Conclusions: Early lung structural damage is associated with later chronic PsA infection in children with CF. CT can potentially be used to personalize monitoring based on risk profile.