ONLINE SUPPLEMENT

Progression of early structural lung disease in young children with cystic fibrosis assessed using computed tomography (Mott *et al*)

METHODS

CT Settings

Supplementary Table – Representative CT Settings

CT settings	Perth		Melbourne	
	Inspiratory	**Expiratory**	**Inspiratory**	**Expiratory**
Tube voltage (kVp)	120	120	120	120
Tube current (mA)	140	140	40	48
Current time-length product (mAs)	70	70	30	36
Rotation time (msec)	500	500	750	750
Slice thickness (mm)	0.63	0.63	1.00	1.00
Collimation (mm)	2x0.625	2x0.625	2x1.00	2x1.00
Estimated CTDI (mGy) *	22.0	22.0	5.0	6.1
Estimated DLP (mGy*cm) *	8.0	8.0	3.0	3.6
Estimated radiation dose (mSv) **	0.1-0.2	0.1-0.2	0.1	0.1

Abbreviations: kVp peak kilovoltage, mA milliamperes, mAs milliamperes seconds, msec milliseconds, mGy milliGray, mSv milliSievert, CTDI CT dose index, DLP dose length product

* Values expressed relative to a 16cm diameter CT dosimetry phantom

** Radiation doses estimated using age specific DLP conversion coefficients for children age 1 to 5 years (Thomas KE, Wang B. Age-specific effective doses for pediatric MSCT examinations at a large children's hospital using DLP conversion coefficients: a simple estimation method. *Pediatric Radiology*. 2008; 38(6): 645-56)

Creation of the Inflammatory Response Score

As neutrophilic inflammatory variables (total cell count, neutrophil count, IL-8 level and NE activity) were highly correlated, they were summarised, guided by a principle component analysis, into a single "inflammatory response score" as the marker of neutrophilic inflammation. First, the 4 variables underwent natural logarithmic transformation for approximate normality since the data were positively skewed. Second, principal component analysis was performed on the correlation matrix and the first principal component, which accounted for 65% of the total variability, was extracted from the data. This principal component was used as the summary measure called the "inflammatory response score". Inflammatory response scores ranged from -5.51 to 6.14 with a median value of -0.05. Higher inflammatory response scores were interpreted as worse neutrophilic inflammation.

Effects of Specific Infection with P. aeruginosa

Current infection with *P. aeruginosa* was determined from BAL culture results, with a positive culture considered with infection at any density. Ever infection with *P. aeruginosa* was determined from annual BAL cultures from diagnosis.

RESULTS

Supplement to Table 1 – Demographics

	Initial scan (*t*-1) n=301	Subsequent scan (*t*) n=301
PULMONARY INFECTION		
Current *P. aeruginosa*	9% (26/298)	10% (30/300)
Ever *P. aeruginosa*	17% (50/298)	23% (70/300)

Supplement to Table 2 – Associations with Persistence of Bronchiectasis

	Change in Bronchiectasis Status		Model 1*	
	Transient	Persistent	Odds ratio (95% CI)	p-value
Current *P. aeruginosa* (initial scan)	11% (4/35)	14% (14/97)	1.40 (0.42-4.63)	0.580
Ever *P. aeruginosa* (initial scan)	17% (6/35)	30% (29/97)	1.87 (0.69-5.06)	0.217
Current *P. aeruginosa* (subsequent scan)	9% (3/35)	15% (15/98)	1.87 (0.50-6.91)	0.350
Ever *P. aeruginosa* (subsequent scan)	20% (7/35)	38% (37/98)	2.26 (0.88-5.77)	0.090

* Adjusted for age at the initial scan

Supplement to Table 3 – Associations with Progression of Bronchiectasis

	Model 1*	
	Regression coefficient ‡ (95% CI)	p-value
Current *P. aeruginosa* (initial scan)	1.03 (0.73-1.45)	0.884
Ever *P. aeruginosa* (initial scan)	1.10 (0.86-1.42)	0.433
Current *P. aeruginosa* (subsequent scan)	1.35 (0.99-1.84)	0.058
Ever *P. aeruginosa* (subsequent scan)	1.27 (1.02-1.59)	**0.034**

* Adjusted for age at the initial scan and severe CFTR genotype

‡ Regression coefficients have been back-transformed from the logarithmic scale

Supplement to Table 4 – Associations with Persistence of Air Trapping

	Change in Air Trapping Status		Model 1*	
	Transient	Persistent	Odds ratio (95% CI)	p-value
Current *P. aeruginosa* (initial scan)	2% (1/42)	12% (21/177)	4.65 (0.75-28.76)	0.098
Ever *P. aeruginosa* (initial scan)	5% (2/42)	21% (38/177)	6.75 (1.50-30.32)	**0.013**
Current *P. aeruginosa* (subsequent scan)	5% (2/42)	12% (21/177)	2.47 (0.61-9.91)	0.203
Ever *P. aeruginosa* (subsequent scan)	10% (4/42)	29% (51/177)	4.36 (1.42-13.41)	**0.010**

* Adjusted for age at the initial scan

Supplement to Table 5 – Associations with Progression of Air Trapping

	Model 1*	
	Regression coefficient ‡ (95% CI)	p-value
Current *P. aeruginosa* (initial scan)	1.30 (1.05-1.62)	**0.014**
Ever *P. aeruginosa* (initial scan)	1.25 (1.05-1.49)	**0.012**
Current *P. aeruginosa* (subsequent scan)	1.20 (0.94-1.52)	0.131
Ever *P. aeruginosa* (subsequent scan)	1.23 (1.01-1.49)	**0.040**

* Adjusted for age at the initial scan and severe CFTR genotype

‡ Regression coefficients have been back-transformed from the logarithmic scale