Pulmonary function and clinical aspects in cystic fibrosis (CF) patients chronically colonized with Pseudomonas aeruginosa

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Chronic colonization with Pseudomonas aeruginosa (PA) in CF patients shows more rapidly decline in pulmonary function (PF).

Objective: To compare the PF and clinical characteristics of CF patients according to the colonization with PA.

Methods: Observational cross-sectional study. We collected data from CF patients who were performed at least four sputum cultures from September 2009 to September 2010. We divided them into four groups according to Leeds Criteria: Chronic infection, Intermittent colonization, Free and Never. We considered: age, genetics, pulmonary function, nutritional status, intravenous (IV) antibiotics and PA antibodies.

Results: We evaluated 97 CF patients: 26% Chronic, 25% Intermittent, 27% Free and 19% Never. The current age (median and interquartile range) was 10.7 (8.5 to 16.2), 5.8 (2.78 to 7.67), 5.5 (4.7 to 8.9) and 4.2 (0.97 to 5.3), respectively (p < 0.001). The homozygous p.508 del was present in 34%, 36%, 29%, and 31% of patients, respectively (p = NS). PA antibodies were 7.6 (4.5 to 16.5), 1.6 (1 to 1.8), 1.5 (1.0 to 2.6) and 0.8 (0.6 to 1), respectively (p < 0.001). The Zscore BMI was -0.39 (--1.14 to 0.13), -0.1 (-0.81 to 0.31), 0.19 (-0.28 to 0.83) and 0.11 (-0.94 to 0.37) in each group (p = NS). The FEV1 was 63 (47.5 to 92.2), 79 (54.7 to 108), 99 (85 to 105) and 109 (105.7 to 112), respectively (p = 0.06). (Chronic vs. Free p = 0.007 and Chronic vs. Never p < 0.001). IV Antibiotic treatments were required in 1 (0–1), 1 (1–2), 0 (0–1) and 0 (0–0), respectively (p < 0.01).

Conclusion: Chronic infection with PA determined lower pulmonary function, more iv antibiotics treatments and had higher level of antibodies than the others groups.

Evolution of lung function in cystic fibrosis patients treated for respiratory tract exacerbation assessed by spirometry and forced oscillation technique

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The objective of the research was to assess the ability of the forced oscillation technique (FOT) to detect changes in lung function in patients with cystic fibrosis (CF) treated with intravenous antibiotics for an acute respiratory tract exacerbation (RTE).

Methods: Twenty-six CF patients had a lung function evaluation with both spirometry and FOT before and after their treatment course for RTE. The evolution of both spirometric (FEV1, FVC, MEF25–75) and FOT parameters (5, 10, 15, 20 and 25 Hz) were assessed and FOT was able to detect significant changes in lung function in CF treated for RTE. We conclude that FOT is not a valuable tool for lung function assessment during CF lung disease.

Reversibility of trapped air on CT scans of cystic fibrosis patients, an automated approach

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Rationale: Trapped air (TA) on expiratory CT scans (TA_CT) reflects small airway disease, and plays an important role in the pathophysiology of early CF lung disease. Little is known about the dynamics of TA_CT over time.

Aims: To assess the course and reversibility of TA_CT over 2 years.

Methods: TA was assessed on 2 consecutive routine expiratory CT scans (TA_CT1, TA_CT2). Lung tissue was segmented to determine Total Lung Volume (TLV). TA volume was determined using thresholds between –975HU and –700HU (manually determined). TA_CT was expressed in percentage TLV. To assess TA_CT reversibility, CT2 and its corresponding TA masks were non-rigidly deformed to match CT1. The volume of TA that was unchanged, disappeared or new relative to CT1 was measured and expressed in percentage overlap volume. Statistical analysis included Wilcoxon’s signed rank test.

Results: 26 patients (14 boys) were included. Baseline median (range) age and FEV1 were 11.9 (5–17) years, and 91 (39–130) %-predicted. Median (range) TA_CT1 and TA_CT2 were respectively 9.5% (2–35%) and 8.0% (0–26%) (p = 0.56). Median (range) TA_CT volume unchanged, disappeared, and new in CT2 relative to CT1 was respectively 3.0% (0–12%), 5.3% (1–22%) and 6.6% (0–20%). The proportion new and reversed TA was significantly higher than the proportion stable TA (p = 0.001 and p = 0.003).

Conclusions: In this study, TA_CT was not progressive over 2 years, and overall, TA appeared to be more dynamic than static over time.