Choice of spirometry values in epidemiological research

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Spirometry values are used in epidemiologic and registry CF research, and generally considered valid parameters for standards of care, morbidity and prognosis. However, pitfalls exist when collecting and interpreting such values, especially when comparing treatment regimens, centers or countries.

Methods: We analysed spirometry values (FEV1 and FEF25−75) from CF center Skejby during a 3 year period. The data were obtained prospectively in the daily clinical setting following the ERS/ATS recommendations for spirometry. Analyses performed included coefficient of variation, comparison of mean and max values, and various calculations of slope.

Results: For FEV1 56% of patients varied more than the normal CF inter-test variation over a 12 month period. For FEF25−75 the number was as high as 86%. For comparison of mean vs max values on a center level we found a visible, but not significant difference. For FEV1 there was a 6% difference using the two methods (p=0.052) and for FEF25−75 a 12% difference (p=0.067). 4 different ways of calculating decline of lung function were performed. Though the results varied slightly there was no significant difference. Decline was steepest in patients with FEV1 of >100% or between 40 and 59%.

Conclusion: One single value of FEV1 may be used a valid marker of that patient’s lung function, whereas FEF25−75 varies too much. Comparing mean to max values on a center basis may grant seemingly large differences. Consensus on method must be reached. Calculation of slope can be done in various ways with little difference in results.

Comparing the ‘best’ spirometry values of the year with values obtained at the ‘last’ consultation in cystic fibrosis patients in Belgium using the CF Registry data

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Objectives: To compare the best % of predicted FEV1 and FVC with values obtained at the last consultation among CF patients.

Methods: The calculations of the % of predicted FEV1 and FVC were done for patients 6 years and above excluding transplants. Means (±SD) and medians (Interquartile range) were calculated for the overall population, by gender and age groups. The overall means for the best % of predicted FEV1 and FVC of the year were 80.9 % (±24.3) and 94.8 % (±19.7) respectively while the last values were 76.6 % (±25.2) and 90.9 % (±21.0). The mean best versus last % of predicted FEV1 was 82.6 % (±24.6) and 78.3 % (±25.7) respectively in males, and 79.0 % (±23.7) and 74.7 % (±24.5) in females. The overall mean differences between the best and the last FEV1 and FVC values were 4.3 % (±7.5) and 3.8 % (±7.3) respectively, all p-values <0.0001.

Conclusions: The results show an overall significant statistical difference between the best and the last % of predicted FEV1 and FVC of about 4 %, even by gender and across most age groups with the greatest difference in the age group 18–24 years. The difference obtained was not within a clinically relevant margin of 5%. This means values reported by the Belgian CF registry and other registries that use the last values of the year are on average 4% lower than those used for benchmarking by European Cystic Fibrosis Registry. These registries can still report these values without fear of being seen as having worse patients compared to other registries and thus maintain continuity of the data recording in their registries.

The disease burden associated with transmissible Pseudomonas aeruginosa strains in adult CF

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Although chronic infection with transmissible Pseudomonas aeruginosa (Psa) strains confers a poor prognosis in CF patients, the disease burden this places on such individuals has not been studied. To investigate this further, using logistic regression, we matched (for age, sex, BMI, FEV1, and time since diagnosis) 47 adult CF patients chronically infected with the commonest UK transmissible Psa strain (the Liverpool Epidemic Strain, LES) with 47 infected with unique Psa strains, respectively.

Conclusions: Significant differences were observed in quality of life, nutritional status, and disease burden compared to patients chronically infected with unique Psa strains. The increased disease burden associated with infection with the LES strain was not significant compared with unique Psa strains. These results confirm the need for the recommendation to avoid use of IV gentamicin and to change to oral gentamicin as first-line treatment for Psa infection. This has implications for quality of life and cost to the patient and healthcare system.