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Original Article

Functional evaluation of breath: spirometry and body plethysmography comparison in people with cystic fibrosis

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Abstract. [Purpose] The aim of the present study was to establish up-to-date data regarding the lung function of cystic fibrosis (CF) patients. [Subjects and Methods] Forty-eight patients of both genders, with a diagnosis of CF, were recruited. As a result our sample presented, according to the GOLD criteria, 23 patients with mild lung obstruction ($FEV_{1\%}$*pred*: 89.86), 16 patients with moderate lung obstruction ($FEV_{1\%}$*pred*: 56.1) and 9 patients with severe obstruction ($FEV_{1\%}$*pred*: 32.1). [Results] All patients presented normal total lung capacity followed by an important residual volume increase. [Conclusion] Our results were important to illustrate the CF patient's lung functional status and to improve the health system strategy in treating such individuals.
Key words: Cystic fibrosis, Spirometry, Rehabilitation

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INTRODUCTION

Cystic fibrosis (CF) is a recessive disorder caused by genetic mutations. The prevalence in Europe is 0.737 per 10,000 and the incidence rate in Italy is estimated at 1/3,000 live births[1)]. It is associated with early airway inflammation with both functional and structural consequences[2, 3)]. Over the last 2–3 decades, the CF has evolved from an acute disease of childhood into a chronic disease of adulthood[4)]. It is known that over half of all CF patients are now over the age of 18, and those patients are able to survive for many years despite their profoundly damaged lungs and reduced lung function[5)]. In Italy the CF prevalence over 10,000 subjects is 0.872[6)]. Considering the importance of establishing up-to-date data regarding this disease, we designed a prospective study to assess the lung function of CF patients treated in our regional cystic fibrosis center.

SUBJECTS AND METHODS

From May to September 2011 at the *Centro Regionale* Cystic Fibrosis in Cesena we evaluated the lung function of 48 CF patients (22 females) aged 21 ± 3. The tests were performed according to ATS/ERS guidelines for spirometry and lung volumes assessments[7, 8)]. As a result our sample presented, according to the GOLD criteria, 23 patients with mild lung obstruction ($FEV_{1\%}$*pred*: 89.86), 16 patients with moderate lung obstruction ($FEV_{1\%}$*pred*: 56.1) and 9 patients with severe obstruction ($FEV_{1\%}$*pred*: 32.1). Informed consent was obtained from all participants and procedures were conducted according to the Declaration of Helsinki.

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Table 1. Anthropometric data

Variable	Moderate COPD (n=23)	Severe COPD (n=16)	Very Severe COPD (n=9)
Antrophometric data			
Gender [male, n (%)]	12 (47.8%)	9 (43.8%)	8 (88.9%)
Age (yrs)	19.2	25.1	21.0
Weight (kg)	47.1	50.1	47.3
High (cm)	155	160	151
BMI ($kg.m^{-2}$)	19.6	19.6	20.8
Spirometry			
FEV_1 *%pred*	85.86	56.10	32.10
TLC *%pred*	100.17	103.35	100.28
RV *%pred*	138.37	195.46	268.94
RV/TLC (%)	135.37	185.53	256.53

Statistical differences are lacking in some lines.

RESULTS

All patients presented normal total lung capacity followed by an important residual volume increase, also demonstrating a moderate to very severe lung hyperinflation besides the airway obstruction. On the studied sample, the lung function loss is similar to those described for the population with cystic fibrosis[5] (Table 1).

DISCUSSION

Over the past six decades, an impressive improvement in survival has been achieved and the CF population growth projection demonstrated an increase by 20% in children and by 78% in adults[6]. Thus data like ours are important to illustrate the CF patient's lung functional status and improve the health system strategy in treating such individuals.

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