Clinical and Functional Profile Pneumopathic Patients of Pre-Transplant Lung

Bruna Angélica Reche Martines[1], Letícia Elias Capatti[1], Eliane Aparecida de Mello Troncoso[2] and Lucas Lima Ferreira[3]*

[1]*Department of Physiotherapy, São José do Rio Preto, Brasil*

[2]*Department of Health Sciences, São José do Rio Preto, Brasil*

[3]*Department of Professional Enhancement in Physiotherapy, São José do Rio Preto, Brasil*

Abstract

Introduction: Lung transplantation is considered the best therapeutic option for the treatment of advanced lung diseases and has gained its space between transplants of other organs.

Objective: To identify the clinical and functional profile of patients in evaluation physiotherapeutic lung pre-transplant in a teaching hospital in the state of São Paulo.

Methods: A retrospective study of 33 patients from October 2013 to April 2016 was performed. Data were analyzed, such as age, sex, oxygen use, comorbidities and spirometry data: forced vital capacity (FVC) and forced expiratory volume in the first second (FEV$_1$), distance walked in the six-minute walk test (6MWT), manuvacuometry (maximal inspiratory and expiratory pressure — MIP and MEP), and quality of life scores according to the Saint George's Respiratory Questionnaire (SGRQ).

Results: There was a higher prevalence of female sex (60.6%) dependent on home oxygen and ex-smokers. The most prevalent disease was COPD (45.4%). The patients had spirometric values of FVC 54% ± 15.7% of predicted and FEV$_1$ 33.6% ± 16.4% of predicted. The distance covered on the 6MWT was 376.4 m ± 125.3 m. The MIP was 69.3 cmH$_2$O ± 25.4 cmH$_2$O and the MEP was 77.2 cmH$_2$O ± 22.3 cmH$_2$O. The SGRQ total score was 60.8 ± 14.8.

Conclusion: The clinical and functional profile of severe lung disease in pre-lung transplantation was characterized by a higher prevalence of COPD and female ex-smokers, dependent on home oxygen, with significant impairment of lung function and functional capacity, muscle weakness respiratory and deterioration in the perception of their quality of life.

Keywords: Pneumopathies; Lung transplantation; Stress test; Physiotherapy

Introduction

Lung transplantation (LP) is considered the best therapeutic option for the treatment of advanced pulmonary diseases (APD) and has gained its place among transplants of other organs. According to the Brazilian Transplant Registry (BTR), between January 2005 and December 2015, 652 LP were performed in Brazil, but there is still a disproportion between the number of people on the waiting list and the number of organs offered [1-3].

After three years of investments, a teaching hospital in the interior of São Paulo was authorized to perform LP, becoming the eighth institution in Brazil, and the first in the interior, to carry out this complex procedure, in accordance with ordinance no. 1152, of November 12, 2015. However, information regarding the data of each patient is necessary to know the population referred to this service [4].

During the evaluation several factors should be considered, seeking the ideal candidate for transplantation, that is, those who present chances to undergo successful surgery and a good expectation of survival. However, many patients arrive late for this evaluation [5].

The diagnoses that determine who will be listed for LP are varied, including cystic fibrosis, pulmonary arterial hypertension, pulmonary fibrosis, bronchiectasis and chronic obstructive pulmonary disease (COPD), which is the most common [2].

The purpose of this study was to identify the clinical and functional profile of the patients
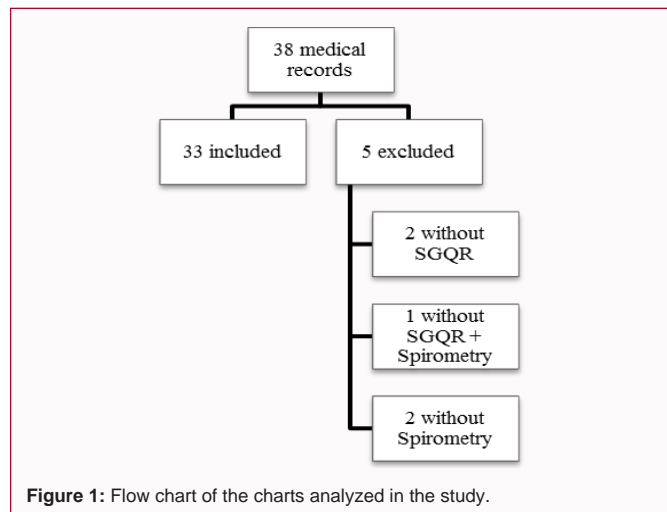
Figure 1: Flow chart of the charts analyzed in the study.

undergoing pre-transplant lung transplantation in a teaching hospital.

Methods

This is a retrospective and exploratory study of patients admitted for pre-transplant lung evaluation by the physiotherapy team, where data were collected from October 2013 to March 2016 at the Hospital de Base de São da Faculdade de Medicina of São José do Rio Preto (FAMERP), São José do Rio Preto, SP, Brazil.

Inclusion and exclusion criteria

Patients of both sexes, of any age, with APD and who underwent pre-transplant lung evaluation with the physiotherapy team were included in the study.

Patients who did not present spirometry, the Saint George's Respiratory Questionnaire (SGRQ) for quality of life (QoL) or any other data inherent in the study were excluded from the study.

Data collect

The sample consisted of 38 medical records, limited by the period from October 2013 to April 2016.

The evaluations were performed by the physiotherapist in the pulmonary rehabilitation room of the hospital, using an evaluation form standardized by the team. The data collected were separated by variables: sex and age; clinical diagnosis – comorbidities (diabetes mellitus and systemic arterial hypertension), use of oxygen (O_2) at home and smoking; spirometry: forced expiratory volume (FVC) and forced expiratory volume of the first second (FEV_1), distance walked in the 6-minute walk test (6MWT), manovacuometry: maximal inspiratory pressure (MIP) and maximal expiratory pressure (MEP), questionnaire of QoL-SGRQ.

The reference values for spirometry and manuvacuometry were those of Pereira et al. [6,7] published for the brazilian population and the reference values published by Enright and Sherrill [8] and by American Toracic Society [9] for the 6MWT. To evaluate the QoL, the SGRQ questionnaire was used, adapted and validated in Brazil by Souza et al. [10].

Ethical aspects

The present study was approved by the Research Ethics Committee of FAMERP under protocol CAAE No. 56500416.9.0000.5415 on June 7, 2016.

Table 1: Clinical and functional characterization of patients with Pneumopathies.

Variable	N (%) or Mean ± standard deviation
Sex (female)	20 (60.6%)
Age (years)	49.4 ± 14.4
Diagnoses	
COPD	15 (45.4%)
Bronchiectasis	8 (24.2%)
Pulmonar fibrosis	6 (18.1%)
Other lung diseases	4 (12.1%)
Comorbidities	
SAH	6 (18.1%)
DM	5 (15.1%)
Home O_2	20 (60.6%)
Ex-smoker	19 (57.5%)
Lung function	
FVC (% provided)	54 ± 15.7
VEF_1 (% provided)	33.6 ± 16.4
Functional capacity	
D6WMT (m)	376.4 ± 125.3
MIP (cmH_2O)	69.3 ± 25.4
MEP (cmH_2O)	77.2 ± 22.3
SGQR	
Symptoms	57.2 ± 21.6
Activity	79.3 ± 16.5
Impact	51.3 ± 17.0
Total	60.8 ± 14.8

m: Mean; N: Number of Patients; Other lung diseases: Cystic Fibrosis, Kartagener Syndrome, Pulmonary Hypertension; SAH: Systemic Arterial Hypertension; DM: Diabetes Mellitus; O_2: Oxygen; FVC: Forced Vital Capacity; FEV_1: Forced Expiratory Volume in the First Second; D6WMT: Distance Covered In The Six-Minute Walk Test; MIP: Maximal Inspiratory Pressure; MEP: Maximum Expiratory Pressure; SGQR: Saint George's Respiratory Questionnaire

Statistical analysis

The data were analyzed by means of descriptive statistics being arranged in tables and described in values of average and standard deviation, numerical and percentage proportions.

Results

Between October 2013 and April 2016, 38 patients with APD were referred to the physiotherapy service for pre-transplant lung evaluation. The final sample consisted of 33 patients (Figure 1).

The variables sex/age and clinical and functional characteristics are presented in Table 1. Among the data found, most of the 20 (60.6%) use home O_2, there is a higher prevalence of females 20 (60.6%) and more than half of sample 19 (57.5%) are former smokers.

Discussion

The present study verified that the clinical and functional profile of patients with APD in pre-LP physiotherapeutic evaluation in a teaching hospital was characterized by a higher prevalence of COPD and female patients with an age range of around 50 years old, former smokers, dependent of O_2 at home, with evidence of low pulmonary function, impaired functional capacity, respiratory muscle weakness and low QoL scores.

COPD is defined by important pulmonary alterations and its progression leads to progressive worsening of dyspnea and limitation of daily life activities (DLA). One of its characteristics is the presence of reduced FEV_1, as found in the analysis of the findings of the present study, this information corroborates with current evidence [11,12].

Santana et al. [13] report that patients with restrictive ventilatory disorders, such as pulmonary fibrosis, have reduced FVC values as confirmed by the reduction in total lung capacity. However, these data differ from those found in our study, since the evaluated patients presented FVC and FEV_1 close to normal values [11]. This fact can be explained by the physiotherapy performance within the pulmonary rehabilitation, since the patients in this sample were in pre-LP physiotherapeutic treatment.

Recent studies have observed a reduction in both FVC and FEV_1 in patients with bronchiectasis, characterized by mixed ventilatory disorder, and these are in accordance with the present study, where they presented reduced FVC and FEV_1 values, characterizing these patients as having ventilatory disorder mixed type [14,15].

The evaluated patients also have similar characteristics to the history of smoking, continuous use of O_2 at home and impairment of QoL. These factors compromise functional capacity, which was also evidenced by the spirometry data, the 6MWT and the manuvacuometry in this sample. Such findings are alarming, since this association increases the risk of morbidity and mortality [16].

In the present study, the analysis of patients charts showed that all presented characteristics similar to pulmonary function loss, progressive increase of symptoms and limitation of functional capacity, although clinical characteristics were different. However, all of them have, as the last treatment option, the LP.

With the accomplishment of this study, it was possible to identify the profile of the patients referred to the physiotherapy service of the institution. Although they present similar characteristics in relation to loss of pulmonary function and limitation of functional capacity, they differ in clinical characteristics.

These findings represent a guide for further studies to evaluate the same variables after a regular pulmonary rehabilitation program supervised by the physiotherapy team and treatment optimization with the multiprofessional team.

Conclusion

The present study verified that the clinical profile of severe lung disease in a preoperative lung transplantation was characterized by a higher prevalence of COPD and female patients, ex-smokers, who were dependent on home oxygen. Already, the functional profile of these pneumopathies was characterized by significant impairment of lung function and functional capacity, respiratory muscle weakness and deterioration in the perception of their quality of life.

References

1. Afonso Júnior JE, Werebe Ede C, Carraro RM, Teixeira RH, Fernandes LM, Abdalla LG, et al. Lung transplantation. Einstein (Sao Paulo). 2015;13(2):297-304.

2. D'Império F. Indication and selection criteria for candidates for lung transplantation. Pulmão RJ. 2006;15(3):175-83.

3. Brazilian Association of Organ Transplantation (BR). Sizing of transplants in Brazil and in each state (2008-2015). Sao Paulo: Brazilian Registry of Transplants; 2015.

4. Grants and renewal of authorization to establishments and health teams for organ removal and transplantation. Brazil: Ministry of Health, Secretariat of Health Care; 2015.

5. Camargo PC, Teixeira RH, Carraro RM, Campos SV, Afonso Junior JE, Costa AN, et al. Lung transplantation: overall approach regarding its major aspects. J Bras Pneumol. 2015;41(6):547-53.

6. Pereira CAC, Duarte AAO, Gimenez A, Soares MR. Comparison between reference values for FVC, FEV1, and FEV1/FVC ratio in White adults in Brazil and those suggested by the Global Lung Function Initiative. J Bras Pneumol. 2014;40(4):397-402.

7. Pereira NH, Fernandes PM, dos Santos RNLC, Carvalho CPGP, Soares MESM, Santos ACBC. Comparison of the obtained and predicted values of maximum respiratory pressures in young adults. Cienc Cuid Saude. 2015;14(1):955-61.

8. Enright PL, Sherrill DL. Reference equations for the six-minute walk in healthy adults. Am J Respir Crit Care Med. 1998;158(5):1384-7.

9. Nici L, Donner C, Wouters E, Zuwallack R, Ambrosino N, Bourbeau J, et al. American Thoracic Society/European Respiratory Society statement on pulmonary rehabilitation. Am J Respir Crit Care Med. 2006;173(12):1390-413.

10. Souza TC, Jardim JR, Jones P. Validation of the Saint George Hospital Respiratory Disease Questionnaire (SGRQ) in patients with chronic obstructive pulmonary disease in Brazil. J Pneumol. 2000;26(3):119-28.

11. Ribeiro Neto NC, Da Silva FN, Cruz CEM, Silotti FR, Malvestio RAS. Evaluation of pulmonary function in active and institutionalized long-term smokers. Acta Biomedica Brasiliensia. 2016;7(1):40-7.

12. Araújo CLP, Karloh M, Santos K, Reis CM, Mayer AF. Long-term pulmonary rehabilitation in chronic obstructive pulmonary disease. ABCS Health Sci. 2014; 39(1):56-60.

13. Santana ANC, Carvalho RMN, Feitosa PHF. Functional aspects of fibrous lung diseases. Pulmão RJ. 2013;22(1):43-5.

14. Dalcin PTR, Perin C, Barreto SSM. Diagnosis and treatment of bronchiectasis: an update. Rev HCPA. 2007;27(1):52-60.

15. Leal RKR. Initial evaluation of patients with bronchiectasis and aspects of clinical follow-up - etiological investigation and quality assessment. Pulmão RJ 2014;23(3):8-12.

16. Maciel SF, Oliveira JCM, Almeida MDT, Afonso Junior JE. Clinical and functional characteristics of patients under evaluation for lung transplantation at Hospital Israelita Albert Einstein (HIAE). ASSOBRAFIR Ciência. 2014;5(1):11-26.