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Respiratory function in Parkinson's Disease

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Introduction

Several past study results have reported that patients with Parkinson's Disease (PD) can have an array of respiratory abnormalities, with aspiration pneumonia and pulmonary embolisms being the main causes of death [1,2].

The aim of this manuscript was to investigate the pulmonary and respiratory muscle function at baseline, to examine the effect of dopaminergic therapy on pulmonary function and to perform a longitudinal respiratory assessment in PD patients.

Methods

At the baseline (T0) all patients were tested both in the OFF state and in the ON state. UPDRS-III and modified Borg scale were administered in both conditions. All patients underwent to lung function testing by a Biomedin ESS-alpha Reference Spirometer coupled with a Biomedin ESS-beta gas analyzer, to assess lung volumes and air flows, expressed as absolute values and as percentage of values expected for controls of a similar age, sex and height. Tiffenau index (FEV1/VC) (TIFF) was presented as absolute value.

Fourteen PD patients were retested, in ON state, 3-4 years after the first evaluation (T1).

Results

Clinical Characteristics are included in Table 1.

Pulmonary Function

Baseline spirometric assessment (T0): lung function tests were normal in all patients in both ON and OFF state at the baseline. The mean FEV1, VC, FVC values and the mean percentages of the respective predicted values (FEV1%, VC%, FVC%) showed a significant increase ($p < 0.001$) after levodopa administration. RV, TLC, and FEV1/FVC ratio exhibited no significant differences between the patients' ON and OFF states.

Longitudinal spirometric assessment (T1): the spirometric results obtained from 14 patients in ON state at T1 (3-4 years after baseline evaluation) showed significant changes in FEV1, FVC and VC values from the baseline, but not changes of the percentages of the predicted values.

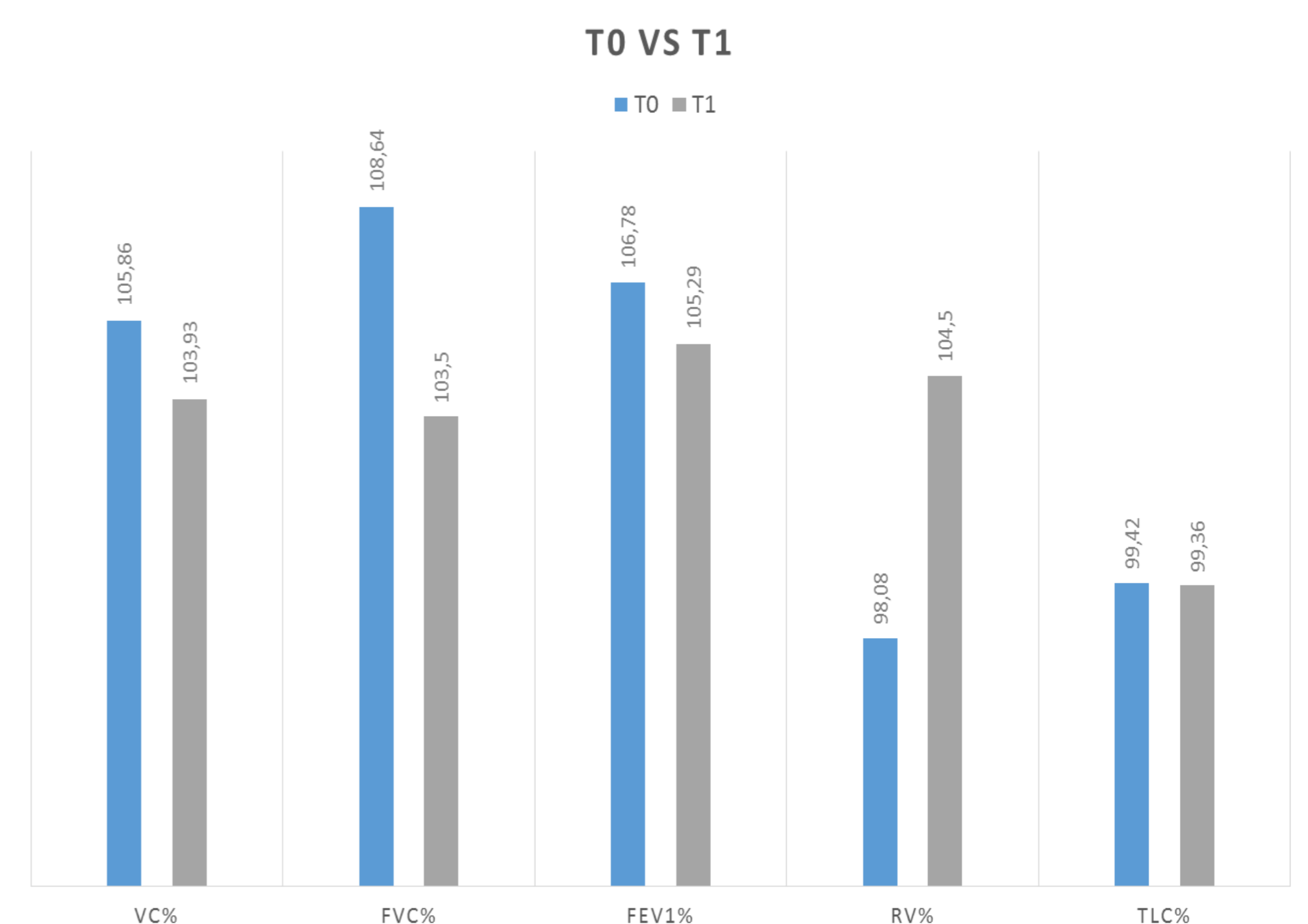
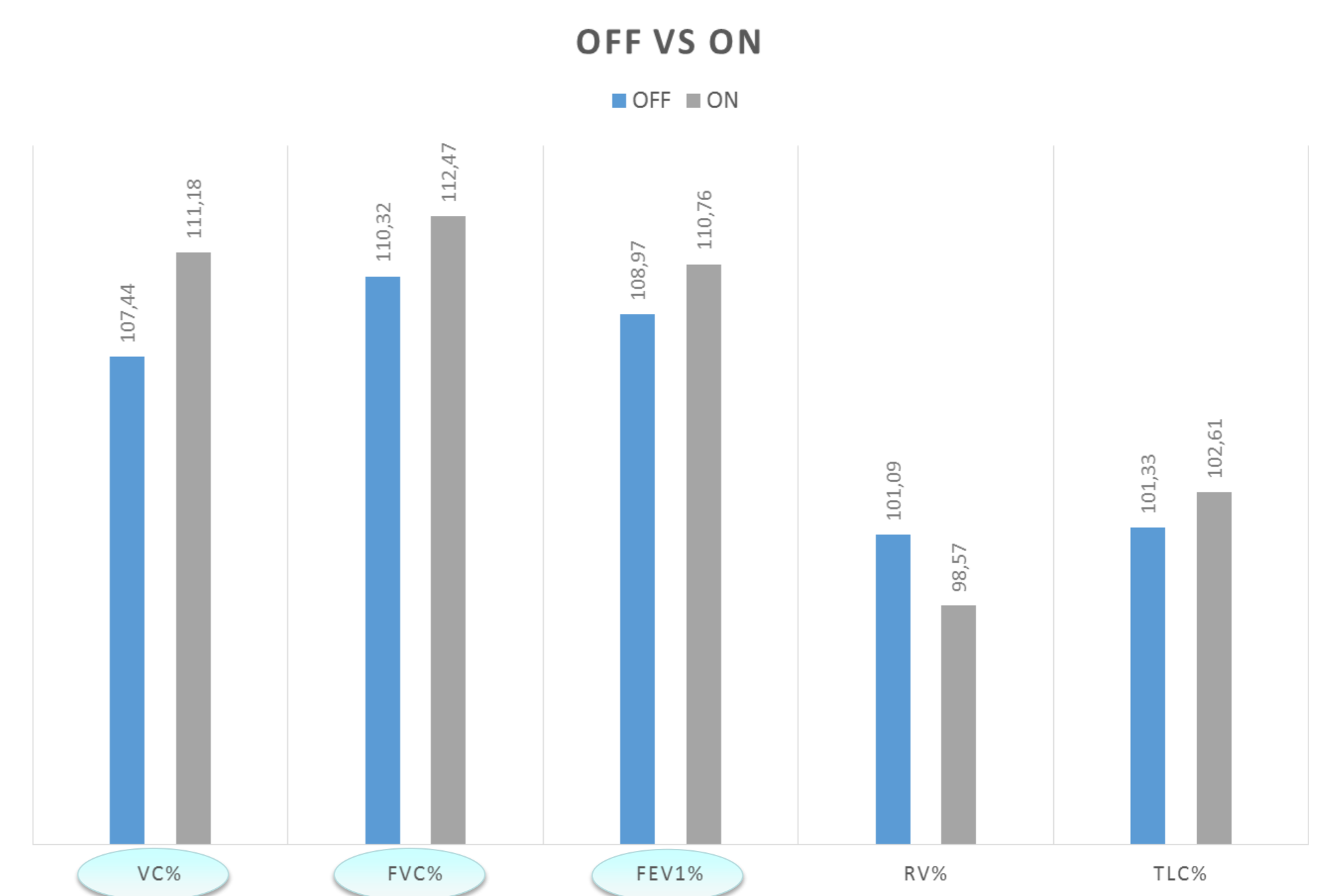
Discussion

The major finding of this study are the differences in measurements of FEV1, FEV1%, VC, VC%, FVC and FVC% values after Levodopa administration, associated with a patient's subjective respiratory state improvement. This improvement was not accompanied by a lung volumes change. The selective improvement of flow's values, rules out a criticizable "learning effect". Non-motor fluctuation can be postulated as underlying phenomenon, in particular, an already previously reported [3] "off state associated with respiratory complaints", probably linked to laryngeal dystonia, stridor and chest wall muscle bradykinesia and rigidity, sensitive to levodopa administration.

Implementation of spirometric studies could be useful in the characterizing respiratory involvement in PD and, as a result, in the anticipating and thus preventing respiratory complications.

Table 1. Subjects' characteristics

Male/female, No.	26/8
Age, yr	63.29±11.26
Duration of disease, yr	5.74±3.41
Hoehn-Yahr scale, No.	2.40±0.62
UPDRS III ON	21.76±7.73
UPDRS III OFF	32.10±9.54



REFERENCES

- [1] Hovestadt A, Bogaard JM, Meerwaldt JD, van der Meché FG, Stigt J. Pulmonary function in Parkinson's disease. *J Neurol Neurosurg Psychiatry* 1989;52:329-333
- [2] Fontana GA, Pantaleo T, Lavorini F, Benvenuti F, Gangemi S. Defective motor control of coughing in Parkinson's disease. *Am J Respir Crit Care Med* 1998;158:458-464
- [3] Mehanna R, Jankovic J. Respiratory problems in neurologic movement disorders. *Parkinsonism and Related Disorders* 2010; 628e638