# EMPHYSEMA IN HIV POSITIVE PATIENT: DIAGNOSTIC AND THERAPEUTIC CONDUCT.

MARCELA AGOSTINI[1-2], LUIS MARCONI[1-2], LILIANA TRAPE[1], JUAN MARTIN TORRANO[2] BUSTAMANTE LILEN[2]

Marcela Agostini. Correo electrónico: marcela.agostini@uai.edu.ar +54 341 4356510

*1- Instituto CAICI, Mendoza 2612, Rosario, Santa Fe, Argentina. Teléfono: 0341-4248045.*

2. *CAECIHS, sede Rosario, UAI. Pellegrini 1618, Rosario, Santa Fe, Argentina. Teléfono: 0341-4408010*

**Abstract:**

The increase of cases of patients with chronic obstructive pulmonary disease in HIV positive patients is a reality since the ARV treatment era. In its beginning, infectious respiratory diseases were the most frequent and prevalent. Different factors were associated to this entity such as the HIV virus itself, antiretroviral treatment, tobacco habit, the use of marijuana, anemia, coinfection with HCV, BMI, nadir and current value of CD4 and viral load. The control of the patient through dyspnea assessment scales and complementary studies such as spirometry, chest CT, 6-minute walk test and carbon dioxide diffusion test have provided tools to contribute to the diagnosis, treatment and prevention of the complications inherent in COPD. Our patient presented a severe respiratory obstruction with FCV less than 70%, FEV1 less than 80%, FEV1 / CFV ratio less than 70%, diffusion test less than 80%, and central emphysema and paralobulillar CT. Its CD4 count and viral load were within the reference range.

Key words: HIV- COPD – ARV

## Introduction

The scientific literature reports a higher incidence of chronic obstructive pulmonary disease (COPD), pulmonary hypertension and lung cancer in HIV positive patients compared to negative ones. It was determined that bacterial pneumonia and COPD are the two most diagnosed pulmonary pathologies.[1-2]

Numerous investigations were conducted evaluating lung function in HIV positive patients under ART. They concluded that there was a probable connection between respiratory alterations, advanced age, smoking habit and high viral loads. In

turn, it was shown that ARV treatment is an independent predictor of increased airway obstruction.[3-4]

Our objective is to communicate a case of a patient with emphysema and HIV positive, its clinical impact correlating with respiratory function tests.

**Clinical case**

A 59-year-old white male patient diagnosed as HIV positive in 1997, presumably sexually-acquired, stage CDC B1. His medical history consisted of tobacco dependence of 4 packs / year, diagnosis of pulmonary tuberculosis in 1988, diagnosis of COPD in 2007 and psoriasis in 2009. In ARV treatment for 20 years, it is currently under treatment with lamivudine- Tenofovir and efavirenz. Good adherence to pharmacological treatment. It does not present co-infections. In treatment for COPD with salmeterol and fluticasone puff. The patient made two unsuccessful attempts to quit smoking. Consultation for exacerbation of dyspnea and cough.

**Physical exam**

Lucid patient oriented in time and space. Taquipneic Size: 1.78cm and weight: 67 Kg. It presents a barrel chest. Decreased vesicular murmur in both pulmonary fields with the presence of isolated rhonchi. No other alterations were found in the physical exam.

**Complementary methods:**

*Laboratory*: Hemoglobin: 13.1gr / dl, C-reactive protein <5, CD4 732 cells / mm3, 37%, CD8 578 cells / mm3, 32% and viral load for HIV <34 copies. Nadir of CD4 628 cells / mm3

*Chest x-ray*:> 10% radiographic emphysema. *Spirometry*: obstructive pattern. *Chest CT*: presents center emphysema and perilobullilar and paraseptal. It was decided to perform a spirometry test again and supplement it with a 6-minute walking test and CO diffusion.

*Spirometry:* FVC (L) pre-bronchodilator 73% of the theoretical value, and post-bronchodilator 91%, below 70%, FEV1 (L) 19% pre-bronchodilator and 20% post-bronchodilator. FEV1 / FCV (%) pre-bronchodilator 25 and post-bronchodilator 21. FEF 25-75% (L / sec) pre-bronchodilator 7 and post-bronchodilator 9.4.

*Walk test 6 minutes*: Distance traveled of 382 meters for a theoretical 572 meter, slow but continuous march. Borg scale: 5 severe. *CO diffusion*: DLCO (ml / min / mmHg) 57%, VA (L) 103, DL / VA (ml / min / mmHg / l) 44.

The studies state that according to the FVC; (,) the FEV1, the FEV1 / FVC ratio and the FEF25-75% are reduced, which indicates airway obstruction. The FVC is reduced in relation to SVC, which indicates air blockage. After administration of bronchodilators, there is a significant response indicated by elevated FVC. The reduced diffusion capacity indicates a moderate degree of loss of alveolar capillary surface functions. It is interpreted as a very severe obstructive pathology of the respiratory tract.

**Discussion**

In our study, the patient had a FCV lower than 70% PB, with a severe decrease in FEV1 of less than 80% and a FEV1 / FCV ratio of less than 70%; the carbon dioxide diffusion test was lower than expected (80%), and on account of the 6-minute walk, a clear decrease in the theoretical value. Tomographically affected pulmonary parenchyma to a severe degree. His symptoms reflect the deterioration of his respiratory health.

According to projections, chronic obstructive pulmonary disease will become the third cause of death by 2030. Early detection and adequate management is a priority to improve the diagnosis and quality of life of patients.[5]

Sampériz G et al[3] observed the presence of airflow limitation, decreased air diffusion capacity, finding smoking and previous TB infection as the main risk factors, as found in our case.

In his work Triplette[6] presents the results found in HIV + patients, with radiographic emphysema> 10% where it was associated with an increase in respiratory symptoms such as chronic cough and / or phlegm, as well as a decrease in walking test of 6. minute, this finding is similar in our patient who consults for exacerbation of his dyspnea and cough and in the walk test of 6 minutes the number of meters traveled by less than the theoretical value in more than 60 meters as recorded in the literature and according to the Borg scale reached its highest level.

A relevant piece of information that emerges from the recently published work of Lambert and Crother[7] reveals the association between airflow obstruction, moderate to severe decrease in carbon dioxide diffusion and an increase in the causes of death among people with HIV and COPD. The mentioned causes are cardiovascular pathologies, liver disease and neoplasms not related to AIDS. Our patient presents a decrease in diffusion capacity, which places him in a situation of risk in front of these pathologies.

However, Ronit et al[8] in their recent work concludes that HIV is a risk factor for a concurrent decrease in FEV1 and FVC and this increased risk is not explained by smoking or socioeconomic status and may be mediated by previous immunodeficiency. This conclusion in relation to smoking is opposed to our work.

HIV in the era of antiretroviral therapy is characterized by the multimorbidity and frequent occurrence of chronic health conditions unrelated to HIV. Respiratory symptoms and chronic lung diseases --including chronic obstructive pulmonary disease, asthma, and cardiopulmonary dysfunction-- are among the conditions that can occur in people living with HIV. Tobacco use, which is disproportionately high among people living with HIV, contributes greatly to the risk of lung disease. In addition, the associated and, at times, exclusive characteristics of HIV such as persistent inflammation, activation of immune cells, oxidative stress may contribute to its pathogenesis[9]

## Conclusion

Our patient has an increased risk of suffering from cardiovascular, hepatic and neoplastic co-morbidities according to functional tests. It is essential to emphasize the cessation of smoking, continue achieving 100% adherence and systematically control his respiratory symptoms to improve his quality of life.

## Conflict of interests

The authors declare no conflict of interest.

## Bibliography


1- Hung, C. C., Chang, S. Y., Lee, K. Y., Sun, H. Y., & Lu, C. L. (2011).Risk and incidence of pulmonary diseases among HIV-infected patients in the era of combination antiretroviral therapy. *American journal of respiratory and critical care medicine, 184*(9), 1086-1087

2- Ghadaki B, Kronfli N, Haider S. COPD symptom and disease screening in an HIV population. Can J Infect Dis Med Microbiol 2015; 26: 69B.

3- Sampériz G, Guerrero D, Lo´pez M, Valera JL, Iglesias A, Rı´os A, et al.(2014). Prevalence of and risk factors for pulmonary abnormalities in HIV-infected patients treated with antiretroviral therapy. HIV Med;15(6):321_9.

4- Madeddu G, Fois AG, Calia GM, Babudieri S, Soddu V, Becciu F, Fiori ML, Spada V, Lovigu C, Mannazzu M, Caddeo A, Piras B, Pirina P, Mura MS.(2013). Chronic obstructive pulmonary disease: an emerging comorbidity in HIV-infected patients in the HAART era?*Infection.41*(2):347-53.

5- Risso K, Guillouet-de-Salvador F, Valerio L, Puglièse P, Naqvi A, Durant J, et al. (2017) COPD in HIV-Infected Patients: CD4 Cell Count Highly Correlated. PLoS ONE 12(1)

6- Triplette, M., Attia, E., Akgün, K., Campo, M., Rodriguez-Barradas, M., Pipavath, S.E .& Soo, G. H. (2017). The Differential Impact of Emphysema on Respiratory Symptoms and 6-Minute Walk Distance in HIV Infection. *Journal of acquired immune deficiency syndromes (1999), 74*(1), e23-e29.

7- Lambert AA[1], Crothers K. (2018) Abnormal Lung Function in HIV-infected Adults: An Under-recognized Risk Factor for Early Mortality Ann Am Thorac Soc.;15(2):160-162.

8- Ronit A, Lundgren J, Afzal S, *et al. (2018)* Airflow limitation in people living with HIV and matched uninfected controls. *Thorax* Published Online. doi: 10.1136/thoraxjnl-2017-211079

9- Fitzpatrick, M. E., Kunisaki, K. M., & Morris, A. (2018). Pulmonary disease in HIV-infected adults in the era of antiretroviral therapy. *Aids*, *32*(3), 277-292.