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Review article

Aging, neurocognitive impairment and adherence to antiretroviral therapy in human immunodeficiency virus-infected individuals

Cezar Arthur Tavares Pinheiro[a,b,*], Luciano Mattos Souza[b], Janaína Vieira dos Santos Motta[b], Evelin Franco Kelbert[b], Clarissa de Souza Ribeiro Martins[b], Marília Silva de Souza[b], Karen Amaral Tavares Pinheiro[b], Fábio Monteiro da Cunha Coelho[b], Ricardo Tavares Pinheiro[b]

[a] Universidade Federal de Pelotas, Faculdade de Medicina, Serviço de Asssitência Especializada em HIV AIDS, Pelotas, RS, Brazil
[b] Universidade Católica de Pelotas, Programa de Pós-Graduação em Saúde e Comportamento, Pelotas, RS, Brazil

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ABSTRACT

Background/objective: There is an increasing number of older patients with human immunodeficiency virus infection due to the success of antiretroviral therapy, the improved prognosis and life expectancy of patients, and the higher number of new infections among older individuals. The main objective of the present study was to compare the characteristics of older human immunodeficiency virus patients with those of younger patients.

Materials and methods: We conducted a cross-sectional study with human immunodeficiency virus-infected patients who were treated at the Specialized Care Service (Serviço de Assistência Especializada) for human immunodeficiency virus/AIDS in the city of Pelotas, South Brazil. Sociodemographic information as well as data on human immunodeficiency virus infection and treatment were collected. All participants underwent psychiatric and neurocognitive assessments, and their adherence to antiretroviral therapy was evaluated.

Results: A total of 392 patients participated in the study, with 114 patients aged 50 years and older. The characteristics showing significant differences between older and younger human immunodeficiency virus-infected patients included race/ethnicity, comorbidities, duration and adherence to antiretroviral therapy, currently undetectable viral load, and cognitive impairment. Compared to younger patients, older patients were at higher risk of exhibiting cognitive impairment [OR 2.28 (95% CI: 1.35–3.82, $p = 0.002$)] and of having increased adherence to antiretroviral therapy [OR 3.11 (95% CI: 1.67–5.79, $p < 0.001$)].

Conclusions: The prevalence of neurocognitive impairment remained high in human immunodeficiency virus-infected patients despite antiretroviral therapy. In the present

* *Corresponding author.*
E-mail addresses: cezarart@terra.com.br, cezaratp@hotmail.com (C.A. Pinheiro).
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study, the prevalence of this type of impairment was significantly higher in patients aged ≥50 years, most likely due to aging, human immunodeficiency virus infection, and a possible synergistic effect between these factors. Despite this higher prevalence, older patients exhibited higher rates of adherence to antiretroviral therapy and of undetectable human immunodeficiency virus viral load.

Introduction

With the advent of antiretroviral therapy (ART), the prognosis of human immunodeficiency virus (HIV)-infected individuals has dramatically improved. The evolution of this therapy into less complex regimens that are safer, easier to administer, and have fewer side effects allows for viral replication to be controlled indefinitely in most patients.[1,2] Despite the success of ART, which led to the reduction of HIV-related opportunistic diseases, HIV-infected individuals exhibit an increase in non-AIDS-defining illnesses that are typically related to aging, such as cardiovascular diseases, dyslipidemia, diabetes mellitus, cancer, liver diseases, renal diseases, bone disorders, and neurocognitive impairment (NCI).[3,4] Aging is accelerated in HIV-infected patients compared to non-HIV-infected patients, with subjects aged 50 years and above being considered elderly.[4–7] Several factors have been associated with the above-mentioned differences in aging, including chronic HIV infection, ART side effects, and accelerated aging of the immune system.[8–10]

NCI in HIV-infected patients has remained highly prevalent even after the advent of ART. In addition to changes associated with HIV (HIV-associated neurocognitive disorder – HAND),[11,12] other factors traditionally related to cognitive impairment are present in HIV-infected patients and have a significant association with cognitive impairment in this population. The contribution of aging to the persistence of NCI has driven growing interest in the study of patients using ART. Several reports have shown a higher prevalence of cognitive impairment among older HIV-infected patients compared to younger patients using ART.[13–16]

There has been an increase in the population of older HIV-infected adults due to increased number of new HIV infections at more advanced ages, the chronic nature of the infection, and increases in life expectancy.[17,18] Further studies are necessary to better understand this population. The objectives of this study were to (i) compare the characteristics of younger HIV-infected patients with those of the older patients; (ii) assess the prevalence of cognitive impairment in HIV-infected patients after the advent of ART; (iii) determine whether an association exists between cognitive impairment and aging among other factors; and (iv) compare ART adherence in HIV-infected patients aged ≤50 years with adherence of younger patients.

Materials and methods

This study was a cross-sectional study that recruited adult HIV-infected individuals diagnosed according to the protocol of the Brazilian Health Ministry. These patients were receiving care at a Specialized Center (Serviço de Assistência Especializada – SAE) for HIV/AIDS in the city of Pelotas, South Brazil, in 2015. Patients with a previous neurological disease and/or psychotic disorder were excluded from the study.

All patients treated at the SAE were invited to participate in the study, and those who agreed signed the informed consent form. The present study was approved by the Ethics Committee. Participants completed a sociodemographic questionnaire and underwent psychiatric and neurocognitive assessments. The instrument used for psychiatric assessment was the International Neuropsychiatric Interview (MINI – Plus). The neurocognitive assessment was performed using the following instruments: Grooved Pegboard Test, Color Trails Test (CTT) parts 1 and 2, Finger Tapping Test, Montreal Cognitive Assessment, and the International HIV Dementia Scale (IHDS). The cutoff point for the latter was a score of 10 or less. All of the assessments were performed within the SAE premises.

Laboratory data and clinical features were abstracted from the patients' medical records. Collected information included stage of HIV infection, use of ART, duration of treatment, time of diagnosis, CD4 counts and viral load, and comorbidities. HIV viral load was considered undetectable when less than 50 copies/mL.

Adherence to ART was measured by self-reporting and the filling of prescriptions at the pharmacy over the previous three months. The patients who reported to have not forgotten a single dose of medication in the past three days and who regularly filled the ART prescription at the SAE pharmacy over the past three months were considered adherent.

Except for the IHDS, there are no standardized cutoff points for the other neurocognitive assessment instruments in Brazil. Therefore, the scores of the remaining instruments (MoCA, CTT-1 and CTT-2, Finger Tapping Test, and Grooved Pegboard Test) were distributed into quartiles. To obtain higher specificity, the individuals who (i) scored in the upper quartile in at least three of the five instruments used, and (ii) reached the IHDS cutoff point were considered positive for NCI.

Evidence of cognitive impairment was also evaluated by the Instrumental Activities of Daily Living (IADL) scale, as standardized by the Clinical Protocol and Therapeutic Guidelines for the Management of HIV Infection in Adults of the Brazilian Health Ministry.

Sociodemographic and clinical data were subjected to descriptive analysis by calculating frequencies of categorical variables, and the means and standard deviations of continuous variables among patients aged 50 years or more and compared to those aged less than 50 years.

Multiple logistic regression was used to analyze the independent association of age with NCI adjusted for prespecified

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