

P-07

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NUTRITIONAL STATUS IN HOSPITALIZED PATIENTS WITH HIV INFECTION

Objective: To describe nutritional status in hospitalized patients and to determine the correlation between nutritional parameters and CD4 cells.

Patient and Methods: We prospectively performed a cross-sectional study of consecutive hospitalized patients in the Infectious Disease Unit of our hospital from 05/96 to 09/96, accomplished through the epidemiological data withdrawal, analytical, clinical and anthropometric measurements: weight, height, triceps skin-fold, midarm circumference, midarm muscle circumference (MAMC), midarm muscle area (MAMA), fat areas (MAFA) and body mass index (BMI) being compared with the reference standards (*Med Clin* 1988;91:223–236). For the statistic calculation we used the program RSGMA® for PC.

Results: We studied 100 patients, 79 were male and 21 female, mean age 33.2 8.2 years (21–63) and 82 had been diagnosed previously of aids. Risk practices for HIV: 74 drug addicts (DA), homosexuality (HMX) 14, and heterosexual 12. Customary use of heroin in 38 patients. The median of CD4 cells was of  $55 \times 10^6/L$  (mean 127.5; 1–830). The most frequent motive of hospitalized were the opportunistic infections (49%). Nutritional status: 6% normal, 65% caloric malnutrition (moderate-severe 81%), 23% mixed (moderate-severe 69%) and 6% protein malnutrition. The CD4 were more lower in the patients with protein malnutrition or mixed respect to the other ( $\times 149.1$  vs 74.5;  $p < 0.05$ ). BMI was inferior to 20 in half of the patients ( $\times 19.8 \pm 2.8$ ). BMI was inferior in the patients whose risk was the DA than in HMX ( $\times 21.3$  vs 19.3; ANOVA  $p < 0.05$ ), in patients customary use of heroin ( $\times 20.5$  vs 18.5;  $p < 0.001$ ), in the patients with advanced HIV disease ( $CD4 < 50$ ,  $\times 20.4$  vs 18.3;  $p < 0.05$ ), and with levels more lower of hemoglobin ( $< 10.5$  g/L;  $\times 20.2$  vs 19.1;  $p < 0.05$ ). MAMC was the anthropometric parameter that greater linear correlation presented with the CD4 cells.

Conclusions: 1. The majority of the patients hospitalized in our Unit with HIV infection already they have been diagnosed of case aids, they are very advanced disease and the malnutrition is customary. Emphasize that almost a third presented some degree of protein malnutrition. 2. The protein malnutrition and mixed is related well to a smaller number of CD4 cells. 3. The malnutrition valued with the BMI was greater in patient that acquired the infection by DA, in patients customary use of heroin, in the patients with advanced HIV disease and in patients with anemia. 4. The nourishment must be considered a high-priority problem in the clinical managing of the patient with HIV infection.

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IMMUNOMODULATORY EFFECT OF ZINC ON CELLS OF THE IMMUNE SYSTEM FROM HIV-1-INFECTED INDIVIDUALS

Clinical improvement has been described in AIDS patients submitted to oral supplementation, however, the mechanisms involved are not well understood.

In order to evaluate the effect of the zinc ions in the enhancement of the immune response, we tested its role in the proliferative response to the PHA mitogen, as well as in prevention of programmed cell death (apoptosis). The mitogenic effect of zinc ( $10^{-4}$  M  $ZnCl_2$ ) on the lymphocyte proliferative response was observed in healthy controls ( $p < 0.01$ ) and only in HIV-1 positive asymptomatic ( $p < 0.05$ ) individuals. However, the zinc treatment of PHA ( $5 \mu g/mL$ ) stimulated PBMC cultures significantly enhanced [ $^3H$ ] thymidine incorporation in asymptomatic ( $p < 0.001$ ) and symptomatic ( $p < 0.0001$ ) patients studied. This enhancement of PHA stimulation by zinc did not induce virus replication, as indicated by the p24 antigen evaluation in the supernatants of cell cultures. Decreased percentage of apoptotic cells could be identified in cell cultures from HIV-1 positive individuals submitted to zinc treatment, when compared to cells treated only with PHA, as detected by both flow cytometry and agarose gel electrophoresis. In substitution to the direct detection of the plasma levels of zinc, we undertook a quantitative determination of  $\alpha_2$ -macroglobulin, a major plasmatic zinc binding protein. A decrease of this protein concentration could be detected in plasma of HIV-1 positive individuals ( $p < 0.01$ ), independently of their clinical or immunological status.

These results indicate that apart from the immunomodulatory effect of zinc ions, a synergistic effect with other immunostimulators, such as PHA, occurs even in immunodeficiency AIDS patients. Moreover, an inhibitory effect of the  $Zn^{++}$  on the extent of lymphocyte apoptosis could be demonstrated. Further studies with zinc supplementation associated to antiretroviral therapy would be of great interest to evaluate the in vivo role of this oligoelement in the improvement of the immunological functions of HIV-1 infected individuals and AIDS patients.

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NUTRITIONAL INTERVENTION IN BRAZILIAN AIDS EX-HOMELESS SUBJECTS LIVING IN A SUPPORT HOUSE

In a previous study we compared survival time between homeless and ex-homeless housed persons with AIDS in Rio de Janeiro from 1990 to 1995. We concluded that appropriate housing facilities together with clinical strategies should be provided to homeless HIV-infected persons, as this approach could duplicate the survival time of ex-homeless patients. Better nutrition is one cofactor that was considered to explain the difference in survival observed amongst the ex-homeless when compared to homeless group.

In this work we intended to study the effects of a balanced diet and nutritional counselling on patients' weight and to correlate these results with clinical events and laboratory data to better understand the impact of nutritional intervention on these patients. Nutritional, clinical and immunologic parameters were assessed in 10 AIDS ex-homeless patients that agreed to take part in this study and were followed up for 7 months during which they were housed at a Support House in Rio de Janeiro, Brazil.

The results showed that after the nutritional intervention, 5 subjects gained weight (BMI) (1 out of 5 had herpes zoster infection), 3 subjects kept weight (1 presented fever, 1 chronic urinary tract infection and 1 oral candidiasis) and 2 patients lost weight—risk factors in these patients were diarrhoea (1 patient) and pneumonia (1 patient). CD4 counts were above 200 in 8 patients (7 gained or kept weight and 1 lost due to pneumonia) and below 100 in the other 2 (1 lost weight due to diarrhoea and 1 kept weight). Our results showed that weight loss was associated to opportunistic infections. We also observed that wasting did not commonly occur on our patients leading us to conclude that weight improvement is possible in AIDS patients under appropriate nutritional support.

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VALIDATION OF MULTIFREQUENCY BIOELECTRICAL IMPEDANCE FOR MEASURING BODY WATER COMPARTMENTS IN PATIENTS WITH HUMAN IMMUNODEFICIENCY VIRUS (HIV) INFECTION

Introduction: Single frequency bioelectrical impedance may be less good at predicting total body water (TBW) and extracellular water (ECW) in unwell patients because the normally close relationship between ECW and TBW may be disturbed. We investigated whether high frequency (for TBW) and low frequency (for ECW) impedance measurements can better predict body water compartments than traditional single frequency (50kHz) measurements in a group of patients with HIV disease.

Methods: Twenty men with HIV infection (mean height 176 cm, weight 69.4 kg; BMI 22.3 kg/m<sup>2</sup>) were studied. TBW was measured by giving an oral dose of deuterium oxide (0.5 g/kg) and measuring the enrichment in saliva obtained before and 4 hours after dosing by an infrared method (precision  $\leq 2\%$ ). ECW was measured by giving an oral dose of sodium bromide (60 mg/kg) and measuring the enrichment in serum obtained before and 4 hours after dosing by a spectrophotometric method (precision  $\leq 2\%$ ). Impedance was measured at multiple frequencies between 4 kHz and 1024 kHz using the SEAC SFB3 analyser. The resistive index (RI: height<sup>2</sup>/resistance) was calculated for measurements at 5, 50, 100, 200, 500 and 1000 kHz as well as for resistance values at zero and infinite frequency obtained by analysis of the resistance-reactance plot. The relationship between the RI at each frequency and measured TBW and ECW was assessed by calculation of the correlation coefficient (r) and the standard error (SE) using linear regression.

Results: The mean TBW was 44.3 L and the mean ECW was 21.9 L. The best predictor of TBW was resistive index at 1000 kHz ( $r = 0.89$ ; SE 3.08 L). The best predictor of ECW was resistive index at zero frequency ( $r = 0.51$ ; SE 3.35 L). Resistive index at the traditional 50 kHz showed the following relationships: TBW ( $r = 0.87$ ; SE 3.24) and ECW ( $r = 0.49$ ; SE 3.40 L).

Conclusion: In this small group of patients, there were trends to suggest that high frequency measurement better predicts TBW and low frequency measurement better predicts ECW than does traditional 50 kHz measurement but there was no significant advantage over the standard method.