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ROLE OF SERUM ALBUMIN IN PRE TREATMENT ASSESSMENT, MONITORING OF THERAPY AND DISEASE PROGRESSION IN HIV/AIDS PATIENTS

Medicine

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ABSTRACT

Objectives: To assess utility of serum albumin as surrogate marker for predicting the severity and progression of HIV/AIDS and for monitoring response to therapy.

Methods: The importance of serum albumin measurement in assessing HIV/AIDS disease progression and in monitoring the response to antiretroviral therapy using CD4 cell count and body weight as parameters was examined in 100 consecutive HIV-infected, therapy-naive individuals who were recruited for antiretroviral therapy at the Gandhi Hospital. The regimen included Tenofovir,Lamivudine,Efavirenze. Pretreatment serum albumin levels, CD4 counts noted.After initiation of ART , patients were followed with serum albumin levels at monthly intervals and CD4 counts at end of 6 months and one year. Response to therapy assessed using change in CD4 counts .

Results: We found significant positive correlation between raise in CD4 and Serum albumin after initiation of ART.Patients whose CD4 count improved after initiation of ART, also had increase in serum albumin, weight gain , less mortality. There were significant positive correlations between pretreatment albumin and both pretreatment CD4 cell count and pretreatment weight.

Conclusions: In developing countries where many patients may not be able to afford to pay for CD4 cell counts and viral load tests, which are the traditional markers for HIV disease, serum albumin would be a very useful surrogate test for predicting severity of HIV infection and for clinical monitoring of response to antiretroviral therapy

KEYWORDS:

Introduction

According to National AIDS Control Organization of India, HIV Estimation 2015 report, National adult (15–49 years) HIV prevalence in India is estimated at 0.26% (0.22%–0.32%) in 2015. In 2015, adult HIV prevalence is estimated at 0.30% among males and at 0.22% among Females. The total number of People Living with HIV (PLHIV) in India is estimated at 21.17 lakhs (17.11lakhs–26.49 lakhs) in 2015 compared with 22.26 lakhs (18.00 lakhs-27.85 lakhs) in 2007. Children(< 15 years) account for 6.54%.Undivided Andhra Pradesh and Telangana have the highest estimated number of PLHIV (3.95 lakhs) followed by Maharashtra (3.01 lakhs), Karnataka (1.99 lakhs), Gujarat (1.66 lakhs), Bihar (1.51 lakhs) and Uttar Pradesh (1.50 lakhs). [1]

Due to the large scale of morbidity and mortality it causes, AIDS is fast becoming a major threat in developing countries including the Indian sub-continent [2].

Various clinical and laboratory markers have been used to estimate disease progression in HIV infection. Markers of AIDS development include viral markers, surrogate markers and nonspecific markers including CD4+T-cell counts [3,4].Other alternate markers include elevated serum β2microglobulin, neopterin, dehydroepiandrosterone, serum cortisol and many others including CRP, ESR, serum albumin, Tumor Necrosis Factor (TNF),Interferon-γ,Interleukin-2.Studies showed that evaluation of CD4 cell count and Plasma Viral Load (PVL) can efficiently be used to monitor the HIV disease progression. However due to the limitations either in the scientific technology and infrastructure or in the finances many developing and poor countries cannot afford these tests. Studies now are focusing on finding cheaper and useful alternate markers in monitoring HIV disease progression. One study suggested that albumin levels may be increased in those who have a virological response to ART [5]. Although serum albumin is not a specific marker of HIV-1 infection, it has been found to be the strongest predictor of mortality [5,6].

Materials and Methods:

Study design: Prospective observational study done in Gandhi Hospital, Secunderabad over a period of one year from 1 JAN 2016 to 30 DEC 2016.

Sample size: 100 patients.
Inclusion criteria: HIV infected adults who are registered for initiation of antiretroviral therapy.
Exclusion criteria: pregnant, lactating mothers, patients with chronic liver disease, chronic kidney disease
Methods : Pre treatment serum albumin levels, CD4 counts noted. After initiation of ART, patients were followed with serum albumin levels at monthly intervals and CD4 counts at end of 6 months and one year. Response to therapy assessed using change in CD4 counts . Any positive correlation between serum albumin levels and CD4 counts noted.

Results:

- Out of 100 patients, 41 are females,59 are males.
- Mean age is 38 years.
- Mean serum albumin at pre treatment visit – 3.1gm%
- Mean serum albumin at end of 1 year- 3.9gm%
- Mean CD4 count at pre treatment visit- 149
- Mean CD4 count at end of 1 year- 230
- We found significant positive correlation between raise in CD4 and Serum albumin after initiation of ART.($p < 0.05$) Patients whose CD4 count improved after initiation of ART, also had increase in serum albumin, weight gain , less mortality.

Discussion: The AIDS disease progression, which is highly variable in infected individuals, is characterized as rapid, intermediate and non progressors. The majority of infected individuals experience intermediate disease progression in which they show Plasma Viral Load (PVL) rise, CD4 cells decline and later development of AIDS related illness in 7-10years.Even with many advances in the availability and effectiveness of ART, still it is difficult to eradicate the infection. More so the patients receiving ART will experience significant side effects. Therefore it is suggested that before initiating ART the patients hematological parameters are to be evaluated and regularly monitored during the therapy. Serum albumin test is a good surrogate marker because the reagents for measuring albumin are cheap and readily available, it may be particularly useful in clinical monitoring in developing countries [6].

Monitoring of serum albumin levels in PLHIV over time, and prior to initiation of ART, has also been shown to predict disease progression and mortality, independently of traditional markers of HIV disease progression such as CD4 count and viral load [6]. In this study, we investigated the utility of serum albumin measurement in disease progression on the one hand and the monitoring of the response to ART on the other hand, using CD4 count and body weight as parameters. The value of such a cheaper test in developing countries where CD4 counts may not be affordable is highlighted. A single measurement of albumin at baseline has been found to be useful in predicting survival in patients with CD4 cell counts of <200 cells/mL, with the risk of death increasing 8-fold in those with albumin <35 mg/Lcompared with those with albumin >445 mg/L [6]. In our study we observed significant positive correlation between raise in CD4 and Serum albumin after initiation of ART. PLHIV whose CD4 count improved after initiation of ART, also had increase in serum albumin, weight gain, less mortality.

Conclusions: Low serum albumin levels among HIV seropositive individuals are associated with faster HIV disease progression and increased mortality rates Antiretroviral Therapy (ART) may cause changes in protein distribution, absorption and may alter the albumin metabolism. In developing countries where many patients may not be able to afford to pay for CD4 cell counts and viral load tests, which are the traditional markers for HIV disease, serum albumin would be a very useful surrogate test for predicting severity of HIV infection and for clinical monitoring of response to antiretroviral therapy

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