Study of Serum Albumin Level in Subjects with HIV Infection, in Relation to CD 4 Count, as a Marker of Immune Suppression

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ABSTRACT

Introduction: HIV/AIDS Infection is one of the commonly encountered illness in our setup. It causes morbidity and mortality worldwide, and the number of HIV-infected patients has increased dramatically in the past decade. Current study aimed to record serum albumin level in patients suffering from HIV infection.

Material and methods: A total of 175 subjects were studied over a period of 3 months. History and examination were done according to the proforma after taking written informed consent. Routine investigations included CD 4 Count and LFT. All data were entered in the master chart and analysed using SPSS Version 20 software

Results: Out of 175 subjects majority were in age group of 41 to 50 years (30.4%) with mean age around 42 years and 101 subjects were males (57.7%). Low serum albumin was found in 67.2% of subjects. 12% of the subjects had CD 4 Count of less than 100 and among subjects with CD 4 Count of less than 100, 76% of the subjects had low serum albumin which was statistically significant with p value of 0.003.

Conclusion: From the study can conclude that in HIV /AIDS patients serum albumin levels correlate with CD 4 counts and can be used as a marker of immune suppression.

Keywords: HIV /AIDS, CD4 Count, Albumin Levels, Immune Suppression

INTRODUCTION

Human immunodeficiency virus (HIV)/AIDS is one of the most commonly encountered illness in our setup.[1-2] It causes morbidity and mortality worldwide, and the number of HIV-infected patients has increased dramatically in the past decade. Human immunodeficiency virus belongs to the family of human retroviridae. It is known to cause systemic infection in humans which mainly affects the immune system of the body. It particularly affects subgroup of T lymphocytes called CD4 cells.[3]

CD4 count have been used widely as the important prognostic marker of HIV disease progression. And use of these markers are often not adequately used in resource limited setup due to underlying high cost and technology.[5]

Recent studies in the past decade have suggested that low albumin levels in HIV infected patients are associated with rapid progression to AIDS and may account for increased mortality. Low levels of albumin is associated with high mortality in HIV infected individuals. Albumin levels at baseline has been found to be predictor of survival of patients with low CD4 count.[6-8] Hence we studied the usefulness of albumin as a marker of immune suppression.

Current research aimed to study serum albumin level in patients suffering from HIV infection and to evaluate the relation between CD 4 Counts and serum albumin levels in patients suffering from HIV infection.

MATERIAL AND METHODS

Primary source of information was Clinical examination, Venous blood samples and urine samples of HIV infected patients presented to K R Hospital Mysuru during May 2019 to July 2019.

Secondary source of information was from published articles, journals, books, related websites are used in planning, developing synopsis and dissertation as a supporting documents. Total duration of study is 3 months from May 2019 to July 2019.

Sample size

Sample size was 175. It was calculated based on the formula $4pq/d^2$.

Where p is the prevalence of HIV Infection in KR Hospital Mysuru over a period of 3 months and q = 1-p and d = 0.4 with confidence interval of 95% and allowable error of 4%

Method of collection of data

The data was collected from all HIV infected patients who presented to K R Hospital Mysuru, in a detailed proforma as per the history given by patient / attendant and venous blood samples (3 ml of venous blood) and urine samples were collected from the patients and following laboratory tests were performed.

Complete blood count

Liver function tests which includes direct and total bilirubin, serum AST ALT and ALP levels, serum Albumin levels.

Renal function tests

CD 4 count

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Urine routine examination which includes urine albumin by dipstick method urine sugars and urine microscopy.

Chest X Ray

All data were analyzed, documented and interpreted as per the laid down protocol.

Inclusion criteria

All HIV infected patients who are more than 18 years old.

Exclusion criteria

- Any preexisting hepato biliary disease causing decrease in albumin level.
- Any preexisting renal disease/ chronic kidney disease causing decrease in albumin level.
- Any preexisting gastrointestinal disease causing decrease in albumin level.
- Any clinical evidence of congestive cardiac failure
- Any evidence of sepsis

STATISTICAL ANALYSIS

Data was entered into Microsoft Excel (Windows 7; Version 2007) and analyses were done using the Statistical Package for Social Sciences (SPSS) for Windows software (version 22.0; SPSS Inc, Chicago). Descriptive statistics such as mean and standard deviation (SD) for continuous variables, frequencies and percentages were calculated for categorical Variables were determined. Association between Variables was analyzed by using Chi-Square test for categorical Variables. Bar charts and Pie charts were used for visual representation of the analyzed data. Level of significance was set at 0.05.

RESULTS

In our study a total of 175 patients were studied over a period of 3 months.

Mean age of the patients was 42 years with majority being in the age group of 41 to 50 years as shown in table 1. Majority of patients were males (57.7% of them) as shown in table 2. In the study around 10.3 % of patients were newly diagnosed with HIV infection and the mean duration of disease among patients was 3.12 years as shown in table 3. In the study most of the patients had initial CD 4 count in
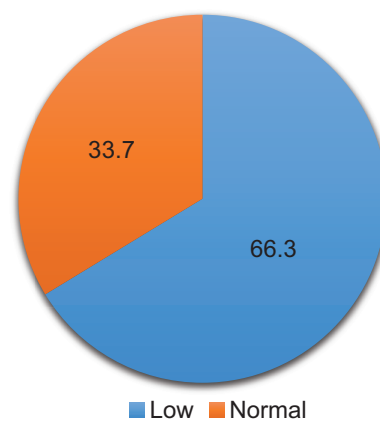
Age (in Years)	No.	Percent
≤ 30	43	24.6
31-40	45	25.7
41-50	54	30.9
51-60	19	10.9
>60	14	8.0
Mean (SD)	42.19 (12.34)	
Range	20-78	

Table-1: Distribution of Study patients according to their Age Group (N = 175)

Gender	No.	Percent
Male	101	57.7
Female	74	42.3

Table-2: Distribution of Study patients according to the Gender (N=175)

Duration of Disease (in Years)	No.	Percent
Newly Diagnosed	18	10.3
≤ 1	42	24.0
1-5	91	52.0
>5	24	13.7
Mean (SD)	3.12 (2.47)	
Range	0.1-15	

Table-3: Distribution of Study Subjects according to the Duration of Disease (N=175)

Initial CD4 Count	No.	Percent
≤ 100	21	12.0
100-200	38	21.7
200-350	48	27.4
350-500	21	12.0
>500	44	25.1

Table-4: Distribution of Study Subjects according to the Present CD4 Count (N=175)

Figure-1: Pie chart showing Distribution of Study Subjects according to the Albumin (N=175)

Albumin	CD4 Count				
	≤ 100	100-200	201-350	350-500	>500
Low	16	30	21	15	33
% Albumin	13.9	26.1	18.3	13.0	28.7
% CD4 Count	76.2	78.9	43.8	71.4	75.0
Normal	5	8	27	6	11
% Albumin	8.8	14.0	47.4	10.5	19.3
% CD4 Count	23.8	21.1	56.3	28.6	25.0
Chi-Square Test, P Value = 0.003, Significant					

Table-5: Association between Albumin and CD4 Count (N=175)

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between 200 – 350 cells/cubic mm (around 30.2%). In our study majority of them had old pulmonary tuberculosis as history of opportunistic infection. In our study majority of the patients were on regular ART. TLE regimen was the most common regimen being used. In the present study 33.7% of subjects had normal albumin (>2.5g/Dl) and 66.3% had low serum albumin (<2.5g/Dl) as shown in fig 1.

Majority (27.4%) of the subjects had present CD 4 Count in between 200-350 as shown in table 4.

76.2% of the subjects with low CD 4 (<100) had low serum albumin which was statistically significant (p value of 0.003) as shown in table 5.

DISCUSSION

A total of 175 subjects were enrolled in the present study. Majority of subjects were in age group of 41-50 years followed by 31-40 years with least in age group of >60 years and the mean age was 42.19±12.34 years. In the study conducted by Koetha et al the mean age was 41.6±2.2 years[9] while in Lang et al the mean age was 47.5±3.4 years.[10]

Among 175 subjects in our study,57.7% were males and 42.3% were females with male:female ratio of 1.36:1. Similarly in the study of Lang et al[10] male : female ratio was 2:1 and in another study Hilalpure sunil et al, Male:Female ratio was 2.77:1.[11]

In the present study, majority of the subjects did not have opportunistic infections, but the most common opportunistic infections in the rest of the subjects was pulmonary tuberculosis (8%) followed by oral candidiasis. Similarly Kohte et al observed low opportunistic infection and oral candidiasis in 13 % cases.[9]

Maximum number of patients in the present study, had baseline CD4 count of >500 indicating that patients had very low risk of opportunistic infection and AIDS defining illness. And most of them were adherent to proper treatment.

In the present study majority of them had CD 4 count in between 200-350(27.4%) followed by >500cells /mm3 (25%) and most of them were on regular treatment on TLE regimen. In study by Hilalpure sunil et al CD4 count In majority cases was between 200-500 [96, 48%] and in 63 [31.5%] it was less than 200, however it was above 500 in 41 [20.5%] cases.[11]

In the present study low albumin was found in 66.7% of the subjects. In subjects with Low CD 4 count (<100) albumin levels were low in 76% of them which was statistically significant with a p value of 0.003. In study by Hilalpure sunil et al there was Significant positive correlation between CD4 count and albumin level.[11] Similarly another study by Sharma et al[12] also showed significant association between CD 4 Count and serum albumin levels (p – value 0.001).

Limitations

Since it was an observational study no intervention was carried out. Majority of our subjects were OPD patients visiting to ART centre hence sick admitted patients were not considered in the study.

CONCLUSION

From the present we can conclude that in HIV /AIDS patients serum albumin levels correlate with CD 4 counts and can be used as a marker of immune suppression.

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