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PREVALENCE OF MICROALBUMINURIA IN HIV-POSITIVE PATIENTS

Prevalence of Microalbuminuria in HIV-Positive Patients

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ABSTRACT:

Human Immunodeficiency Virus (HIV) infection is associated with several systemic complications, including renal involvement. Microalbuminuria is considered an early indicator of kidney damage and may reflect disease progression in HIV-infected individuals. The present study aimed to determine the prevalence of microalbuminuria among HIV-positive patients and to evaluate its association with CD4 cell count in a tertiary care hospital in South India.

A total of 80 HIV-positive adult patients who attended the outpatient department during the study period were enrolled. Participants were categorized into two groups based on CD4 count: Group A (≤350 cells/µL) and Group B (>350 cells/µL). Clinical examination and laboratory investigations including urine microalbumin, albumin-creatinine ratio, 24-hour urine protein, and serum creatinine were performed. Statistical analysis was carried out to determine correlations between variables.

The study found that microalbuminuria was present in 11.25% of patients, and all cases were observed in individuals with CD4 counts ≤350 cells/µL. Significant differences were also observed in urine microalbumin levels, albumin-creatinine ratio, and proteinuria between the two groups. These findings indicate a strong association between reduced CD4 count and renal involvement in HIV patients.

The results emphasize the importance of early screening for renal abnormalities in HIV-infected individuals to prevent progression to chronic kidney disease

Keywords: HIV infection, Microalbuminuria, CD4 count, Renal involvement, Proteinuria, Kidney disease.

INTRODUCTION:

Human Immunodeficiency Virus (HIV) infection remains a major global health concern, affecting millions of individuals worldwide. The disease progresses from an asymptomatic stage to Acquired Immunodeficiency Syndrome (AIDS), resulting in multiple systemic complications involving various organs. Among these complications, renal involvement is increasingly recognized as an important cause of morbidity in HIV-infected individuals.

Kidney dysfunction in HIV may occur due to direct viral infection, opportunistic infections, immune complex deposition, or adverse drug reactions associated with antiretroviral therapy. HIV-associated nephropathy (HIVAN) is one of the well-known renal manifestations and may

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eventually progress to end-stage renal disease if not identified early.

With the introduction of highly active antiretroviral therapy (HAART), survival among HIV patients has significantly improved. However, longer life expectancy has also led to an increased incidence of chronic diseases such as chronic kidney disease (CKD) in this population. Early identification of renal involvement is therefore essential in improving patient outcomes.

Microalbuminuria is considered an early marker of kidney damage and endothelial dysfunction. It often precedes overt proteinuria and may indicate early renal involvement even before clinical symptoms appear.

Several studies have reported varying prevalence rates of microalbuminuria among HIV patients, suggesting a potential relationship between disease progression and immune status measured by CD4 cell count.

Despite available data, limited studies have compared microalbuminuria prevalence in patients with different CD4 count categories, particularly in the South Indian population. Therefore, this study was conducted to evaluate the prevalence of microalbuminuria among HIV-positive patients and to determine its correlation with CD4 cell count.

AIM AND OBJECTIVES

Aim

To evaluate the prevalence of microalbuminuria among HIV-positive patients and to determine its association with CD4 cell count.

Objectives

- To estimate the prevalence of microalbuminuria in HIV-infected patients attending a tertiary care hospital.
- To assess the relationship between microalbuminuria and CD4 cell count.
- To evaluate renal function parameters including serum creatinine and urinary protein levels in the study population.
- To identify possible clinical correlations between renal involvement and demographic characteristics

MATERIALS AND METHODS

Study Design

This study was conducted as a hospital-based observational study.

Study Setting

The research was carried out in a tertiary care hospital in South India among patients attending the outpatient department.

Study Population

A total of 80 confirmed HIV-positive adult patients were included in the study.

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Study Duration

The study was conducted over a period from November 2008 to June 2009.

Group Classification

Participants were divided into two groups based on CD4 count:

- Group A: CD4 count ≤350 cells/µL
- Group B: CD4 count >350 cells/µL

Each group consisted of 40 patients.

Inclusion Criteria

- Adult male patients with confirmed HIV infection
- Non-pregnant female patients with HIV infection
- Patients not yet initiated on antiretroviral therapy

Exclusion Criteria

- Pediatric patients
- Patients with known renal disease
- Individuals with diabetes mellitus
- Patients with hypertension
- Patients with urinary tract infection
- Patients with collagen vascular disorders
- Patients receiving nephrotoxic drugs
- Patients unwilling to participate in the study

Data Collection

Demographic and clinical information such as age, gender, occupation, and mode of HIV transmission were recorded. A complete clinical examination was conducted, and disease staging was performed according to standard guidelines.

Laboratory Investigations

The following investigations were performed:

- Complete blood count
- Blood urea
- Serum creatinine
- Random blood sugar
- Urine routine examination
- CD4 cell count
- Urine microalbumin estimation
- Albumin-creatinine ratio
- 24-hour urinary protein estimation
- Electrolyte analysis

Statistical Analysis

All collected data were entered into a Microsoft Excel spreadsheet and analyzed using statistical software. Results were considered statistically significant when the p-value was less than 0.05.

RESULTS

Demographic Characteristics

The study included 80 HIV-positive patients with a mean age of approximately 33.85 years. Among them, 41 patients (51.25%) were males and 39 patients (48.75%) were females. The majority of infections occurred through heterosexual transmission.

The mean CD4 count among the entire study population was approximately 387.7 cells/µL.

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Patients in Group A had significantly lower CD4 counts compared to those in Group B.

Prevalence of Microalbuminuria

Microalbuminuria was detected in 9 out of 80 patients, resulting in a prevalence rate of 11.25%. Notably, all patients with microalbuminuria belonged to Group A, indicating a strong association between lower CD4 count and renal involvement.

The mean urine microalbumin level was higher in Group A compared to Group B, and the difference was statistically significant.

Albumin-Creatinine Ratio

The albumin-creatinine ratio was also significantly elevated among patients in Group A. These findings further supported the presence of early kidney damage in individuals with lower immune status.

Overt Proteinuria

Overt proteinuria was identified in 6 patients (7.5%), and all these cases were observed in the group with lower CD4 counts.

Serum Creatinine Levels

Elevated serum creatinine levels were found in 8 patients (10%). The majority of these patients also belonged to Group A, suggesting compromised renal function in patients with advanced disease.

Correlation Analysis

A significant correlation was observed between microalbuminuria and CD4 cell count. However, no significant association was found between microalbuminuria and factors such as age, gender, body mass index, or clinical stage of disease.

Table - 1

CD4 Group	Number of patients	CD4 count cells/µL	MeanCD4 count cells/µL
A	40	≤ 350	236.75 ± 79.77
B	40	> 350	538.65 ± 151.53
Total	80		387.70 ± 193.78

Table-2

SEX	CD4 GROUP		TOTAL	
	A	B		
MALE	21 (52.5%)	20 (50%)	41	(51.25%)
FEMALE	19 (47.5%)	20 (50%)	39	(48.75%)

Table – 3

Microalbuminuria	CD4 Group		Total
	A	B	
Absent	31 (77.5%)	40 (100%)	71 (88.75%)
Present	9 (22.5%)	0	9 (11.25%)
Total	40 (100%)	40 (100%)	80 (100%)

p value = 0.001 Significant

Table – 4

Overt Preoteinuria	CD4 Group		Total
	A	B	
Absent	34 (85%)	40 (100%)	74 (92.5%)
Present	6 (15%)	0	6 (7.5%)
Total	40 (100%)	40 (100%)	80 (100%)

p value = 0.011 Significant

Table – 5

CD4 Group	24 Hours Urine Protein (mg/day)	
	Mean	SD
A	227.98	104.37
B	144.18	43.42

p value = 0.000 Significant.

Table – 6

Serum Creatinine	CD4 Group		Total
	A	B	
Elevated	7 (17.5%)	1 (2.5%)	8 (10%)
Normal	33 (82.5%)	39 (97.5%)	72 (90%)
Total	40 (100%)	40 (100%)	80 (100)

p value = 0.025 Significant.

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DISCUSSION

Renal involvement in HIV infection has become an increasingly important clinical issue due to improved survival of patients receiving antiretroviral therapy. Early detection of kidney dysfunction is crucial to prevent long-term complications such as chronic kidney disease and end-stage renal disease.

Microalbuminuria is widely recognized as an early marker of renal damage and endothelial dysfunction. In HIV-infected individuals, microalbuminuria may indicate subclinical kidney disease even in the absence of symptoms. The prevalence of microalbuminuria reported in previous studies ranges from approximately 9% to 30%.

In the present study, microalbuminuria was identified in 11.25% of patients, which is consistent with findings reported in other research studies conducted in different populations. Importantly, all cases of microalbuminuria were observed in patients with CD4 counts below 350 cells/µL. This supports the hypothesis that immune suppression plays a significant role in the development of renal abnormalities in HIV patients.

The study also demonstrated a higher albumin-creatinine ratio and increased protein excretion in patients with lower CD4 counts. These findings are consistent with earlier research suggesting that renal complications are more common in individuals with advanced HIV disease.

Interestingly, no significant relationship was observed between microalbuminuria and demographic factors such as age and gender. Similar observations have been reported in other studies, indicating that immune status rather than demographic variables may be the primary determinant of renal involvement.

The findings highlight the need for routine screening of renal parameters in HIV patients, particularly those with reduced CD4 counts. Early diagnosis of microalbuminuria can help initiate timely interventions and prevent progression to severe kidney disease.

However, the study had certain limitations including a relatively small sample size and lack of long-term follow-up. Additionally, viral load estimation and renal biopsy were not performed, which could have provided further insights into disease progression

CONCLUSION

The present study demonstrates that microalbuminuria is relatively common among HIV-infected individuals and is strongly associated with lower CD4 cell counts. Patients with CD4 counts ≤350 cells/µL showed a higher prevalence of renal abnormalities compared to those with higher immune status.

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These findings suggest that microalbuminuria can serve as an early indicator of renal involvement in HIV patients. Routine screening for urinary albumin and renal function should be incorporated into the clinical evaluation of HIV-positive individuals, particularly those with advanced disease.

Early detection and appropriate management of renal complications may help reduce morbidity and improve long-term outcomes in this population.

REFERENCE:

1. Bourgoignie JJ. Renal complications of human immunodeficiency virus infection. Kidney International. 1990.
2. Seney FD, Burns DK, Silva FG. Acquired immunodeficiency syndrome and renal disease. American Journal of Kidney Diseases.
3. Schwartz EJ, Szczech LA, Ross MJ, et al. Impact of antiretroviral therapy on HIV-related renal disease.
4. Gupta SK, Mamlin BW, Johnson CS, et al. Proteinuria and chronic kidney disease in HIV-infected patients.
5. Fauci AS, Lane HC. Human Immunodeficiency Virus Disease. Harrison's Principles of Internal Medicine.
6. Baekken M, Os I, Sandvik L, Oektedalen O. Microalbuminuria in HIV patients.
7. Szczech LA, Grunfeld C, Scherzer R, et al. Microalbuminuria in HIV infection.
8. Busch HW, Riechmann S, Heyen P, et al. Renal changes in HIV patients.
9. Luke DR, Sarnoski TP, Dennis S. Incidence of microalbuminuria in HIV infection.
10. Kimmel PL, Phillips TM, Ferreira-Centeno A, et al. HIV-associated renal disease.
11. Glassock RJ, Cohen AH, Danovitch G, Parsa KP. HIV infection and kidney involvement.
12. Ramalingam S, Kannangai R, Zachariah A, et al. CD4 counts in South Indian population.
13. Kannangai R, Kandathil AJ, Ebenezer DL, et al. Viral load and CD4 levels in HIV patients in India.
14. Kimmel PL, Umana WO, Bosch JP, et al. Urinary protein abnormalities in HIV patients.
15. Agaba EI, Agaba PA, Sirisena ND, et al. Renal disease in HIV infection.
16. Cravley ST, Cantwell B, Abwalta A, et al. Asymptomatic proteinuria in HIV patients.
17. Varma PP, Prasher PK, Deshpande GV, et al. Renal lesions in HIV patients.
18. Gardner LI, Holmberg SD, Williamson JM, et al. Renal outcomes in HIV-infected women.
19. Szczech LA, Hoover DR, Feldman JG, et al. Renal disease outcomes in HIV.
20. Ramezani A, et al. Proteinuria among HIV patients.
21. Szczech LA, Gange SJ, van der Horst C, et al. Predictors of renal disease in HIV infection.
22. Atta MG, Choi MJ, Longenecker JC, et al. CD4 count and HIV-associated nephropathy.

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