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GLOMERULAR FILTRATION RATE OF HUMAN IMMUNODEFIENCY VIRUS (HIV) PATIENTS ATTENDING HIV CLINIC AT BENUE STATE UNIVERSITY TEACHING HOSPITAL, MAKURDI, NIGERIA.

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ABSTRACT

Background: Glomerular disease with proteinuria and renal failure are common complications of human immunodeficiency virus (HIV) infection. Human immunodeficiency virus (HIV) – related renal diseases are important causes of end stage renal disease in Africa. HIV positive individuals are routinely screened for creatinine and urea levels in HIV clinics in Nigeria but glomerular filtration rate is not routinely calculated and as a result early renal dysfunction is usually missed. We aimed to estimate the glomerular filtration rate (GFR) of HIV positive individuals seen at the HIV clinic of Benue State University Teaching Hospital (BSUTH), Makurdi, Nigeria. **Objectives:** To determine the glomerular filtration rate of HIV positive individuals attending HIV clinic at BSUTH, Makurdi Nigeria **Method:** One Hundred and fifty two HIV positive individuals attending HIV clinic and 65 age and sex matched HIV sero-negative individuals (controls) from Medical Outpatient Department were recruited. **Result:** Forty three (28.3%) of HIV positive individuals attending had estimated GFR ≤ 60mLs/minute compared to 5(7.7%) of HIV sero-negative individuals (control). The result was statistically significant. **Conclusion:** There is high prevalence of HIV positive individuals with renal insufficiency attending HIV clinic at BSUTH. This finding emphasizes the need for routine estimation of GFR of HIV positive individuals.

KEYWORDS: Glomerular Filtration Rate, Human Immunodeficiency Virus, End Stage Renal Disease.

INTRODUCTION

Human Immunodeficiency Virus (HIV) – related renal diseases are common causes of end stage renal disease (ESRD) in Africa.[1] Several studies done across Africa clearly demonstrates this fact.[2-4]

The era of highly active antiretroviral therapy (HAART) has resulted in remarkable improvement in outcome of management of HIV infection and has changed the leading causes of morbidity and mortality in HIV positive individuals from infectious to non-infectious causes thus making kidney disease an important cause of morbidity and mortality in these patients.[5] Kidney dysfunction in HIV infection results via a number of mechanisms including progression of HIV infection, HIV-induced inflammation, comorbid diseases like hepatitis, diabetes mellitus, hypertension, and drugs such as Non-Steroidal Anti Inflammatory Drugs (NSAIDS) and HAART.[6,7] The glomerular filtration rate is the amount of plasma filtered through the glomeruli per unit time.[8] Glomerular filtration rate refers to the sum filtration rate of all functioning nephrons.[8] The GFR is thus an index of renal function. A low GFR indicates renal insufficiency. As a result, it is important to routinely check the serum creatinine and subsequent estimation of GFR of HIV positive individuals as this will allow early detection of renal dysfunction thus permitting early intervention. This will greatly reduce the number of HIV positive individuals with end stage renal disease.

In addition to the above accurate assessment of renal function is important in HIV infected patients in order to adjust dosages of drugs excreted by the kidney knowing that a number of commonly used antiretroviral drugs are nephrotoxic. Thus, it is important to have an assessment of the GFR of all HIV infected patients prior to the commencement of anti-retroviral therapy.[9-12]

MATERIALS AND METHODS

This was a cross- sectional study on the glomerular filtration rate of HIV patients accessing care at Benue State University Teaching Hospital, Makurdi. The study was conducted over a 9 month period. The subjects consisted of 152 HIV positive individuals recruited from HIV clinic. The control consisted of 65 age and sex matched HIV sero-negative individuals recruited from medical outpatient department of the hospital.

Inclusion criteria for the study included HIV positive individuals confirmed by western blot aged 18years and above and those who gave informed consent.

Exclusion criteria included pregnancy, menstruation, fever, urinary tract infection, diabetes mellitus, heart failure, chronic use of nephrotoxic drugs and individuals who refused to give consent. Ethical approval from the study was obtained from the ethical and research committee of Benue State University Teaching Hospital and written consent was obtained from subjects.

A questionnaire was used to collect relevant information including socio demographic data. Investigation performed by subjects included serum creatinine, HIV screening and confirmation. Serum creatinine was repeated within 3 months for confirmation. Estimated Glomerular Filtration Rate (eGFR) was calculated using Chronic Kidney Disease Epidemiology Collaboration (CKD-EPI) Creatinine equation.[13,14]

According to the K/DOQI CKD stage definition, analyses were stratified by baseline eGFR level: greater than or equal to 90 ml/min/1.73 m^2 (stage 1), between 60 and 89 ml/min/1.73 m^2 (stage 2), 30- 59 ml/min/1.73 m^2 (stage 3), 15-29 ml/min/1.73m^2 (stage 4) and less than 15 ml / min (Stage 5).[15]

Data analysis

The Statistical Package for Social Sciences (SPSS Inc. Chicago II) version 21.0 statistical software was used for data analysis.

Quantitative variable were expressed as means ± standard deviation while categorical variables were expressed as proportions. The t-test and the chi-square test were used in the comparison of means and proportions respectively. P-value <0.05 was considered statistically significant**.**

RESULTS

The mean age of the subjects was 37±9.3 years. Of the 152 HIV positive individuals that participated in the study 46 (30.3) were males while 106 (69.7%) were females while out of the 65 control subjects (HIV negative individuals) 20 (30.8%) were males while 45 (69.2%) were females. The mean age was 37± 9 for HIV subjects and 37± 10 for non HIV control. Twenty seven (17.8%) of HIV positive individuals had eGFR between 30- 59 ml/min compared to 5 (7.7%) of the HIV sero-negative individuals (control). Thirteen (8.6%) and 3(2.0%) of HIV positive patients had eGFR between 15-29ml/ min and less than 15 ml/min respectively. Table 1 The result was statistically significant. Forty three (28.3%) of the 152 HIV sero-positive individuals had GFR less than 60mls/min while 5 (7.7%) of the HIV sero-negative individuals (control) had eGFR less than 60mls/ml.

Table 1: Distribution of glomerular filtration rate in HIV subjects and Control.

Variable	HIV Subjects n=152	Control n=65	P Value
Sex			
Male	46(30.3%)	20(30.8%)	0.849
Female	106(69.7%)	45(69.2%)	
Mean Age	37 ± 9	37 ± 10	1,000
eGFR Stage	44(28.9%)	43(66.1%)	
1 90ml/min	65(42.8%)	17 (26.2%)	
2 60-89	27(17.8%)	5 (7.7%)	0.000
3 30-59	13(8.6%)	0	
4 15-29	3 (2.0%)	0	
5 ≤ 15			
eGFR ≤60ml/min	43(28.3%)	5(7.7%)	0.000
≥60ml/min	109	60	

DISCUSSION

The prevalence of HIV Positive individuals with estimated GFR less than 60mls/minute from our study was significantly higher (28.3%) than that of age and sex matched non-HIV positive controls (7.7%). This is similar to the report by Janabi MY et al,[16] in their study on renal abnormalities associated with HIV infection in Dar-es Salaam, Tanzania where 28.4% of HIV positive patients had renal insufficiency. Similarly Abene et al,[17] reported that 30.8% of HIV infected patients receiving treatment at the HIV clinic in Jos, Nigeria had renal dysfunction. The prevalence of patients living with HIV with reduced estimated GFR ≤ 60mls/minute has been shown to vary widely across regions.[18] Abnormal renal function has been identified in about 30% of HIV patients.[19] Individuals of sub-Saharan descent including Nigeria have been impacted most by renal disease as a complication of HIV with HIV associated nephropathy (HIVAN) being the most common histological variant.[20,21] Wools-Kaloustian K et al reported a prevalence of 11.5% of HIV patients with CKD in Kenya,[22] while Owiredu WK et al,[23] reported a

prevalence of 13% of HIV patients with CKD in Ghana. Gemtholtz TE et al in their study of renal biopsies of HIV infected persons in South Africa reported that 27% of HIV patients had HIVAN a leading cause of end stage renal disease,[24] while Fernando et al,[25] reported a prevalence of 24% in their study.

In Nigeria, the prevalence of renal insufficiency in HIV positive individuals ranges from 22%-53%. For instance, Anyabolu et al,[26] reported a prevalence of 22.9% in Owerri Nigeria while Emem CP et al[2] reported that 38% of HIV infected patients had chronic kidney disease in their study. Dada et al,[27] reported a prevalence of 47.6% in a study conducted at Ilorin, South West Nigeria. Ijezie et al,[28] and Agaba EI et al,[3] reported a prevalence of CKD in HIV positive individuals to be 50% and 51.8% respectively in Jos. Okafor UK et al,[29] reported the highest prevalence of 53.3% of CKD patients with HIV seen at University of Benin Teaching Hospital, Benin-City, Nigeria.

The wide variation of prevalence of CKD in HIV patients across regions could be due to variation in diagnostic criteria used in studies as well as differences in study design and the characteristic of the study population.

The finding of high prevalence of HIV patients with reduced GFR <60mls/min from this study also underscores the need for dose adjustment of drugs as most of these patients are often treated with potentially nephrotoxic drugs like tenofovir, lamivudine, didanosine, amphotericin, foscarnet.

It is recommended that HIV positive individuals should have their GFR determined at time of diagnosis and when they are to be placed on potentially nephrotoxic drugs.[9]

CONCLUSION

Estimation of glomerular filtration rate in HIV infected persons would be useful for early diagnosis of HIV associated nephropathy and other glomerular diseases and for identifying patients at high risk for subsequent decline in kidney function who also may develop cardiovascular disease or renal complications from antiretroviral agent or other therapies. This will greatly reduce the number of HIV patients with end stage renal disease and cardiovascular disease both leading causes of morbidity and mortality in these patients.

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