Journal of Natural Sciences Research www.iiste.org
ISSN 2224-3186 (Paper) ISSN 2225-0921 (Online)
Vol.5, No.6, 2015

Prevalence of Systemic Lupus Erythematosus in HIV Positive and other Patients Attending Selected Hospitals in Zaria, Kaduna State, Nigeria

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Abstract
Systemic lupus erythematosus (SLE) is a systemic disease, involving tissues and multiple organs often damaged by pathogenic autoantibodies and immune complexes. The research was undertaken to determine the incidence of SLE among middle-aged female patients in respect to their HIV status, attending selected Hospital Kaduna State. A total of 100 middle-aged female patients were selected randomly comprising of 50 blood samples of HIV negative and 50 samples of HIV positive patients and assayed to confirm their HIV status using the Determine HIV-1/2 test Strip. SLE latex agglutination test was used to determine the presence of SLE antibodies in the among the study population test. A total of 27 patients tested positive for SLE representing 27% prevalence among the study population. In respect to their HIV status, 25 (50%) of the Human Immunodeficiency Virus (HIV) positive patients were positive for SLE while only 2 (4%) were SLE positive among the HIV negative patients. In respect to age range among the HIV positive patients, patients aged 45 and above had the highest prevalence of SLE of 78% followed by those between 35 and 44 years which had a prevalence of 57%.The least prevalence was found in the lower age range of 18 – 24 years. Among the HIV, HIV negative patients that presented with malaria, typhoid, diabetes all tested negative for SLE while only 6% of those with generalized fever tested positive for SLE. It was also found that the single patient with Rheumatoid arthritis tested positive for SLE.
Keywords: Systemic Lupus erythematosus, Human Immunodeficiency Virus antibodies, Rheumatoid arthritis

1. Introduction

Systemic lupus erythematosus (SLE) is a systemic disease, involving tissues and multiple organs often damaged by pathogenic autoantibodies and immune complexes (Ben‐Menacham, 2010). It is clinically diagnosed by the presence of discoid rash, photosensitivity, oral ulcers, arthritis, serositis (pleuritis, pericarditis), renal involvement, neurologic disorder (seizures, psychosis), immunologic disorder (hemolytic anemia, leucopenia, thrombocytopenia), characteristic facial malar rash, and immunologic disorder (Batra and Rajeev, 2006). Antinuclear antibody and anti‐double‐stranded DNA (dsDNA) are positive with very high titers, though serum complement levels (C3, C4) remain low. Lupus arthritis does not usually involve spine (Davies, 1991). However, complications of systemic lupus erythematosus (SLE) can involve any system in the human body including central nervous system, which explain the high prevalence of neuropsychiatric manifestations among SLE patients in children (Yu, *et al.,* 2006) as well as adults (Hanly, *et al.,* 2007). Neuropsychiatric SLE manifestations are wide ranging and they include cognitive and mood disorders, anxiety disorder, depression and psychosis (Honczarenko, *et al.,* 2008; Zakeri, *et al.,* 2011). One of the hallmarks of SLE is the loss of tolerance to nuclear antigens and the development of immune complexes that deposit in tissues and cause widespread inflammation. Alteration of T cell–B cell interactions has therefore been proposed as the common pathogenic mechanism that leads to disease (Shlomchik, *et al.,* 2001). SLE is characterized by flares that progressively result in deterioration of the patient. These flares are often associated with environmental triggers such as viral infections. Infection could trigger the unabated production of IFN-a in SLE patients (Virginia, *et al.,* 2006).

Due to the rarity of SLE it is difficult to accurately determine the incidence, but it has been estimated to be between 2.0 and 7.6 cases per 100,000 population per year (O'Neill and Cervera, 2010). The prevalence of lupus is estimated at 12.5–78.5 cases per 100,000 population in Europe and the USA with a female: male ratio in the range of 9:1 (Petri, 2002; O'Neill and Cervera, 2010). In the UK SLE is approximately 2.5 times more common in South Asian and 5–6 times more common in Afro- Caribbean individuals (Johnson, *et al.,* 1995).

The aetiology of lupus is still a puzzle, since there is no one specific cause of SLE, however, a number of unknown environmental influences such as sunlight, viruses or bacteria, hormonal change that occurs during a woman's life time such as during puberty or pregnancy can cause this reactions in genetically predisposed people (Mok and Lav, 2003). Retroviral infections including HIV have been proposed as a possible etiological factor in autoimmune disease such as SLE (Talal, *et al.,* 1999). SLE and HIV infection in the same individual is being increasingly reported as the incidence of HIV is increasing dramatically particularly in African and Asia (McGill and Oyoo, 2002). Endogenous retrovirus infections in humans are capable of integrating in key sites involved in immune regulation, thereby generating an abnormal autoimmune response with the subsequent

generation of antiretroviral antibodies that are cross-reactive with common nuclear antibodies (Adelman and Marchalonis, 2002). Thus, the aim of this research is determine incidence of Systemic Lupus Erythematosus among middle-aged female patients presenting with HIV and Non-HIV, attending selected Hospital Kaduna State.

2. Materials and Methods

2.1 Study area and population

The study was conducted among female patients attending two medical centres in Zaria; and focused on the middle-aged female population, within the age range of 18 to >45, fifty (50) of which were HIV positive and the other fifty HIV Negative. Ethical approval for the study was obtained from the hospital's ethical committee and patient's consent was also obtained. A structured questionnaire was also administered to obtain demographic data as well as health history of the patients

2.2 Sample Collection

A total of 100 middle-aged female patients were selected randomly from among the patients attending the two hospitals mentioned above i.e. 50 blood samples of HIV negative and 50 samples of HIV positive patients. Questionnaires were administered to each patient before sample collection. The blood samples were collected in appropriately labeled sterile plain bottles and were then transported to the microbiology laboratories. The samples were allowed to clot and then centrifuged at 2500rpm for three minutes to obtain the serum. The serum was transferred into a serum bottle and was refrigerated at 5^{o}C for further assay.

2.3 Confirmation of the HIV Status using the Determine HIV-1/2 test Strip

All samples obtained from the patients were assayed to confirm their HIV status using the Determine HIV-1/2 test Strip. The process was carried out according to the manufacturer's instruction. Briefly, the test strip was removed from its protective foil and a drop of clear serum was applied to the sample spot of the pad. This selenium colloid- antigen conjugate mixture is allowed to migrate through the solid phase to the immobilized recombinant antigens and synthetic peptide at the patient's window site when the buffer is applied. The result is read after 15 minutes

2.4 Determination of SLE Antibodies in the Patients

The SLE latex reagent (a polystyrene latex particle coated with DNA extracted from fetal calf thymus, Diagnostic Automation USA) was used for the test. This was also carried out in accordance with the manufacturer's instructions. A drop of the SLE latex was added on each of the specimen on the slide or tile. The end of the pipette was used to spread and mix the specimen. Different pipette was used for each sample. The specimen was gently rocked, observing for agglutination all within one minute, the presence of agglutination indicated a positive result.

3. Results

A total of 27 patients tested positive for SLE representing 27% prevalence among the study population (fig. 1). The result showed that among the 50 HIV positive samples, 25 of the sample tested positive for SLE and 2 patients tested SLE positive among the HIV negative patients. In respect to their HIV status, 25 (50%) of the HIV positive patients were positive for SLE while only 2 (4%) were SLE positive among the HIV negative patients (table 1).

In respect to age range among the HIV positive patients, patients aged 45 and above had the highest prevalence of SLE of 78% followed by those between 35 and 44 years which had a prevalence of 57%.The least prevalence was found in the lower age range of 18 – 24 years. Similarly, the HIV negative patients recorded higher incidence in the higher age ranges (table 2).

Among the HIV negative patients that presented with malaria, typhoid, diabetes all tested negative for SLE while only 6% of those with generalized fever tested positive for SLE (table 3). It was also found that the single patient with Rheumatoid arthritis tested positive for SLE.

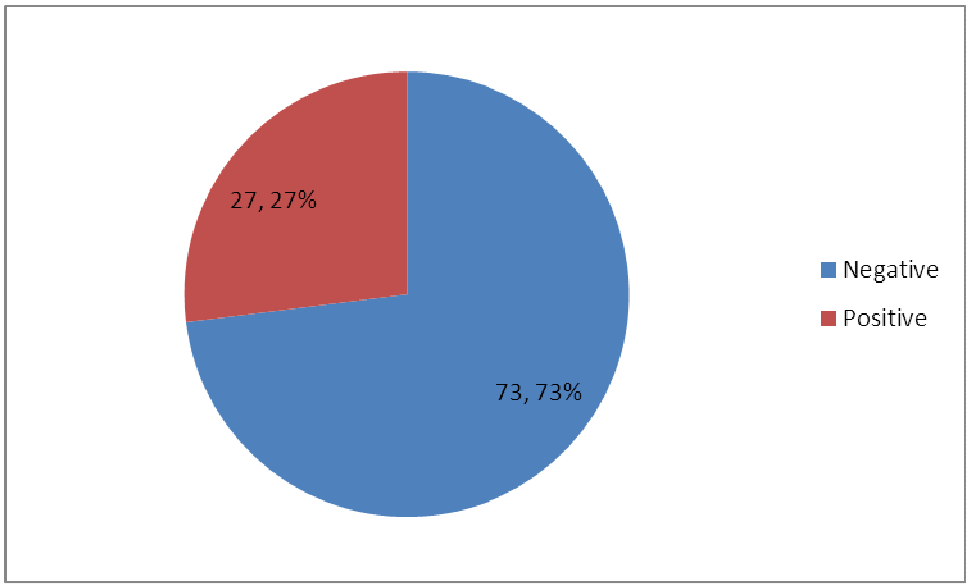

Figure 1: Prevalence of SLE among the Study Population in Zaria

Table 1: Prevalence of SLE in respect to HIV status of Patients

HIV Status	No Examined	No (%) Positive
HIV Positive	50	25(50)
HIV Negative	50	2(4)
Total	100	27(27)

Table 2: Prevalence of SLE with respect to age of Patients

Age range	HIV Positive		HIV Negative	
	No Sampled	No (%) Positive	No Sampled	No (%) Positive
18 - 24	5	1(20)	8	0(0)
25 - 34	15	5(33)	22	0(0)
35 - 44	21	21(57)	15	1(7)
45 - >	9	7(78)	5	1(20)
Total	50	25(50)	50	2(4)

Table 3: Prevalence of SLE in respect with type of illness other than HIV

TYPE OF ILLNESS	No Examined	No (%) Positive
Fever	18	1(5.5)
Rheumatoid Arthritis	1	1(100)
Typhoid Fever	14	0(0)
Malaria	12	0(0)
Diabetes	5	0(0)
Total	50	2(4)

4. Discussion

The finding revealed that SLE is present in the study area Zaria in Kaduna state, though the incidence had not received the attention it deserved. This may be due to the fact that the symptoms mimic that of Rheumatoid Arthritis (RA) and therefore often misdiagnosed as RA. In this study, the patient who was being treated for RA tested positive for SLE. A survey carried out in the United Kingdom reported a 48% incidence of arthritis and fever in up to 16% in SLE patients (Cervera, *et al.,* 2003). The present study revealed a prevalence of 4% among patients with illnesses other than HIV who reported to the hospitals presenting with generalized conditions. The level of those that tested positive is however high considering the reported cases from several countries worldwide. Reports based in several countries indicate very low prevalence varying from 64.99/100 000 in 1999 to 97.04/100 000 in 2012 in UK (Rees, *et al.,* 2014). It was also estimated to be between 2.0 and 7.6 cases per 100,000 population per year (O'Neill and Cervera, 2010). The high prevalence in this study could be related to the fact that the study was limited to women who are known to have higher incidence than men. SLE has been reported to be was six times more common in women and some researchers report a female: male ratio in the range of 9:1(Petri, 2002; O'Neill and Cervera, 2010).

On the other hand, the incidence was high with a 50% prevalence among the HIV positive women. This high incidence of SLE in HIV positive individuals have also been reported by some workers (McGill and Oyoo, 2002), and this has led to the possibility that HIV and other retroviruses could be implicated in the etiology of SLE (Talal, *et al.,* 1999). This may be due to the ability of endogenous retrovirus to integrating into key sites involved in immune regulation, thereby generating an abnormal autoimmune response with the subsequent generation of antiretroviral antibodies that are cross-reactive with common nuclear antibodies (Adelman and Marchalonis, 2002). The invasion of the virus provides key insights in immune response researchers now hope triggers SLE. It is well documented that HIV infection mimics the presentation of auto immune disorders like SLE, and HIV being a virus is among the environmental factors that can trigger SLE (Wallace, 2002).

In respect to age of the respondents, patients that were within the age range of 34-41 had the highest prevalence among the patients irrespective of their HIV status, confirming the fact the disease is mostly found among the people of higher age range especially the middle aged. Age range below 25 had the lowest prevalence among the patients. The age related prevalence has been reported by many workers (Hopkinson, 1992; Rees, *et al.,* 2014).

Considering nature of illness, being one of the risk factor used in this study, the highest prevalence was among patients presented with persistent illness while none of those with recurrent illness tested positive.

5. Conclusion

The prevalence of SLE in HIV negative patients is low (4%) and patients with SLE often tested positive for RA. The patients who are HIV positive had the highest prevalence of up to 50% indicating a possible association between HIV and SLE. The age factor is one of the major criteria used in this study with the highest prevalence among the 34 and above year age group. So basically SLE affects the middle aged compared to other age group.

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