Original Research Article

The Prevalence of Bacteriospermia in Patients with Clinically Diagnosed HIV/AIDS in Port Harcourt

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Abstract

Purpose: To investigate the prevalence of bacteriospermia in male patients with clinically proven HIV/AIDS in Port Harcourt, Nigeria.

Methods: Using standard methods, sperm samples were collected by masturbation after 3 days of abstinence from 120 male patients with clinically diagnosed HIV/AIDS aged 18-57 with a mean age of 39.5; this included 65 single and 55 married men and analyzed for sperm quality and bacteriological profile.

Results: Of the 120 patients tested, 90 (75%) had bacteriospermia with at least one pathogen (*Staphylococcus aureus*, 30%, *Staphylococcus saprophyticus*, 13%, *Escherichia coli*, 20%, *Proteus mirabilis*, 10%, *Proteus vulgaris*, 10%, *Klebsiella* spp., 10% and *Pseudomonas aeruginosa*, 7%). The prevalence of bacteriospermia was higher in singles 60 (50%) compared to married 30 (25%) and significantly (P=0.05) higher in subjects 28-37 and 38-47 years age group (both 30%) followed by the 18-27 years age group (15%).

Conclusion: A relatively high rate of prevalence of bacteriospermia has been identified among HIV/AIDS patients studied. This is dependent of age and marital status of the patients.

Keywords: Sperm quality, Infertility, Bacteria profile, Viral infection, Immunity, Prevention, Public health.

Introduction

The acronyms HIV and AIDS are invariably inseparable because the former is the etiologic agent of the latter. AIDS is a late stage of HIV infection characterized by immune dysfunction and deregulation leading to a severely weakened immune system that can no longer ward off opportunistic infections [1-3]. Two types of HIV have been reported namely, HIV-1 and HIV-2 [4]. HIV-1 is more pathogenic and is found mainly in the United States, Europe, Asia, East and Central Africa while HIV-2 is mainly limited to West Africa [5]. However, it has also been reported that HIV-1 is more prevalent in Nigeria [6, 7].Once the human CD4+ cells are infected by HIV, a mild form of AIDS may eventually develop with symptoms that include fever, malaise, headache, macular rash, weight loss, lymph node enlargement, oral candidiasis,

presence of HIV-1 antibodies and generalized weakening of the immune system leading to an overwhelming vulnerability to infections, these symptoms are known as AIDS-Related Complex (ARC) [8]. HIV is known to lead to different types of opportunistic infections such as tuberculosis, bacterial pneumonia, septicaemia, herpes simplex and herpes zoster virus, HIV-associated malignancies such as Kaposi's sarcoma, lymphoma and squamous cell carcinoma and sexually transmitted infections. Sexually transmitted infection is a major cause of bacteriospermia and male infertility globally, susceptibility increases with HIV infectionand asymptomatic bacteriospermia has been implicated [9, 10]. Genital tract infection and inflammation have been reportedly associated with 8-35% of male infertility cases [11, 12]. The presence of bacteriospermia will further complicate the disease conditions of HIV/AIDS patients as infection processes may lead to deterioration of spermatogenesis, impairment of sperm functions and obstruction of the seminal tract [13, 14].

There is paucity of information concerning the prevalence of bacteriospermia among HIV/AIDS infected patients in Nigeria. Therefore, the aim of this study was to evaluate the prevalence of bacteriospermia among HIV/AIDS infected patients in Port Harcourt, Nigeria.

Experimental

Study area, population and ethical consideration

Semen samples were obtained from 120 patient (65 single and 55 married men with age range 18-57 year) with clinically diagnosed HIV/AIDS attending the University of Port Harcourt Teaching Hospital (the biggest hospital in Rivers State that serves Port Harcourt and its environs) and who agreed to participate in this study were recruited. The diagnosis of HIV/AIDS in the UPTH HIV laboratory is based on the WHO recommended strategy for HIV antibody testing using two kit methods. The HIV screening uses the Abbott Determine HIV 1, an enzyme linked immunosorbent assay (ELISA) test (Abbott Diagnostics, Tokyo,

Japan). The test is an immuno-chromatographic test for the qualitative and differential diagnosis of HIV 1 and 2 in human serum. All initially positive tests are confirmed using Immunocomb HIV 1 and 2 kits (Orgenics, Yavne, Israel). CD4 lymphocyte count are also carried out on EDTA anticoagulated samples using the Dynal beads method (Invitrogen, Carlsbad, CA). This method is an alternative method to flow cytometry for the enumeration of peripheral CD4 lymphocyte in resource-limited settings. The Dynal beads technique uses paramagnetic polymer beads coated with anti CD4 monoclonal antibodies (mAbs) to capture and isolate CD4 T-lymphocyte from whole blood. Previous study indicated that CD4 count from Dynal beads method correlated positively and significantly with values from flow cytometry (r = 0.90). Demographic information about each person screened was obtained from the hospital referral form. Such information included sex, age, occupation, address and clinical diagnosis. Pre and post-test counseling was offered to all test subjects. Ethical approval was obtained from the University of Port Harcourt Teaching Hospital Institutional Review Board, Port Harcourt. Written informed consent was obtained from all study subjects. All information about persons screened was kept confidential.

Sample collection and processing

The semen were collected from the patients after 3 days of abstinence through masturbation. Prior to the sample collection, patients were advised to wash their hands and genital area with soap and water and did not take any antibiotic one week before the samples were collected. All specimen were collected into sterile containers and quickly transported to the bacteriological laboratory and processed [15]. Cultures were incubated at 37 °C for 24 - 48 hr. Smears of semen were prepared on clean-grease-free slide and stained with gram staining technique and all emergent colonies from the culture were analysed as previously described [16, 17]. Nigrosin-eosin staining technique and sodium bicarbonate-formalin fluid diluted 1/20 were used for the enumeration of sperm cells morphology and count, respectively. Control semen from 12 (7 single and 5 married) HIV/AIDS negative patient was also treated

according to the WHO guidelines on semen examination and evaluation.

Statistical analysis

The prevalence of bacteriospermia was determined from the proportion of positive individuals to the total number of individuals under consideration, and expressed as percentages. Chi-square (X^2) test was employed to determine the relationships between bacteriospermia, sperm quality and HIV/AIDS.

Results

Of the 120 samples analyzed, 90 (75%) yielded the growth of bacteria namely *Staphylococcus aureus, Escherichia coli* and *Staphylococcus saprophyticus, Proteus mirabilis, Proteus vulgaris, Klebsiella* spp., and *Pseudomonas aeruginosa. S. aureus had the highest proportion of samples with growth of bacteria.* (Tables 1 and 2). The prevalence of bacteriospermia in patients with clinically HIV/AIDS varied with age (Table 1). The prevalence among the unmarried (single)

patients (50%) was significantly higher that that of the married patients (25%) for those that were married (Table 3, (p=0.05). Bacteriospermia was higher among individuals in the age bracket of 28-37 and 38-47years (30% respectively) followed by 18-27 years age group (15%) and none recorded among individuals of age group 48-57.

Discussion

In this study, 75% bacteriospermia prevalence among adult males with clinically diagnosed HIV/AIDS was observed. *S. aureus, E. coli, S. saprophyticus, P. mirabilis, Proteus vulgaris, Klebsiella* spp., and *P. aeruginosa* have been identified in the semen of HIV positive patients. Of these organisms, *S. aureus, E. coli* and *S. saprophyticus* are known to be the main organisms causing the most negative effect on sperm morphology and motility [12, 18]. As expected, these organisms found in the semen of the patients will affect sperm morphology and total motility. A similar finding has been reported previously [10].

Table 1: Distribution of bacteriospermia in patients with clinically diagnosed HIV/AIDS attending University of Port Harcourt Teaching Hospital according to age

Age Group (years)	Number (%) with Bacteriospermia	Number (%) without Bacteriospermia	Total Screened
18-27	18 (15.0)	12 (10.0)	30
28-37	36 (30.0)	12 (10.0)	48
38-47	36 (30.0)	0 (0.0)	36
48-57	0 (0.0)	6 (5.0)	6
Total	90 (75.0)	30 (25.0)	120

Table 2: Bacterial isolates, sperm morphology and motility

Bacterial isolates (%)	Abnormal sperm Morphology (%)	Total sperm Motility (%)
Staphylococcus aureus (30%)	80	40
Staphylococcus saprophyticus (13%)	70	30
Escherichia coli (20%)	70	30
Proteus mirabilis (10%)	60	20
Proteus vulgaris (10%)	60	20
Klebsiella spp. (10%)	70	20
Pseudomonas aeruginosa (7%)	50	10

Table 3: Marital status related prevalence of bacteriospermia in patients with clinically diagnosed hiv/aids attending University of Port Harcourt Teaching Hospital

Marital Status	Number of patients (%)	
	Bacteriospermia present	Bacteriospermia absent
Single	60 (50.0)	5 (4.2)
Married	30 (25.0)	25 (20.8)
Total	90 (75.0)	30 (25.0)

Generally, the risk of infertility increases by age but most of the subjects recruited in this study were young. Male urogenital tract infection is one of the most important causes of male infertility worldwide [11]. It should be noted that the presence of HIV/AIDS lead to dysfunction and deregulation of the immune system and therefore increases vulnerability to bacterial infection and poses a risk to the fertility profile of male patients. HIV-positive individuals are at a greater risk of contracting opportunistic infections, and treatment for co-infected patients is complicated by interaction between prescribed drugs.

In this study, a significantly higher bacteriospermia prevalence rate was observed among singles (50%) as compared to married (25%) and significantly higher bacteriospermia prevalence rate was observed among patients in the 28-37 and 38-47 year age group (30% respectively) followed by 18-27years (15%). The higher incidence rate found within the singles could be attributed to the synergy between HIV/AIDS and other sexually transmitted infections (STIs) which makes the singles more vulnerable during unprotected vaginal intercourse with women [3]. Single unmarried persons are more likely to maintain multiple sex partners or be involved in high risk sexual behaviors such as homosexuality, commercial sex work, alcohol use and intravenous drug abuse that make them even more vulnerable to sexually transmitted infections and consequently bacteriospermia which may lead to infertility. Both casual and chronic substance users are more likely to engage in high risk behaviors such as unprotected sex, when they are under the influence of drugs or alcohol. Research conducted throughout the sub-Saharan Africa has found close association between alcohol uses, risk taking sexual behaviors, sexually transmitted infections and HIV/AIDS infection [3].

Conclusion

A relatively high rate of prevalence of bacteriospermia has been identified among HIV/AIDS patients studied. This prevalence is dependent on age and marital status. Therefore, there is urgent need for the establishment of quality laboratory system in the country for screening and informing the population of their STI/HIV/AIDS status. Health education is indispensable as it is a major point in prevention and control of STI/HIV/AIDS. There is no cure for HIV/AIDS; therefore, prevention is the only weapon available to human race to emancipate itself from the dread of the HIV/scourge.

Acknowledgements

Conflict of interest

No conflict of interest associated with this work.

Contribution of authors

The authors declare that this work was done by the author(s) named in this article and all liabilities pertaining to claims relating to the content of this article will be borne by the authors. OOO conceived and designed the study and was involved in data analyses while OO and CAI collected and analysed the data.

References

1. Mindel A. AIDS epidemiology and natural History. AIDS: a pocket book of diagnosis and management. 1990: 1-32.
2. National AIDS/STD control programme. Handbook on HIV Infection and AIDS for Health Workers,

Federal Ministry of Health, Abuja, Nigeria, 1992: 12-14.

3. Oyeyipo OO, Azuounwu O, Owhoeli O. Prevalence of HIV antibodies in patients with clinical tuberculosis in Port Harcourt. International J Biosci 2010; 5(30): 65-68.

4. Abimiku AG, Zwandor G, Kyari N, Opajobi S, Ibanga S, Guyit A, et al. HIV-1 not HIV-2 is present in Nigeria: need for consideration in vaccines plans. Vaccine Res 1994; 3 (2): 101-103.

5. UNAIDS/WHO. AIDS epidemic update. 2001.

6. Federal Ministry of Health. AIDS Statistics, Federal Ministry of Health, Lagos, Nigeria, 1990.

7. Olaleye OD, Beernstein L, Ekueozor CC. Prevalence of human immunodeficiency virus types I and 2 infection in Nigeria. J infect Dis 1993; 16: 710-714.

8. Kuby J. Immunology.3rd ed. Freeman and Company, New York. 1997:664.

9. Bukharin OV, Kuzmin MD, Ivanov IB. The role of microbial factor in the pathogenesis of male infertility. Zhurnal Microbiolgii Epidemiologii Immunologii 2003; (2): 106-110.10. Isaiah IN, Nche BT, Nwagu IG, Nnanna II. Current studies on bacteriospermia the leading cause of male infertility: a protégé and potential threat towards mans extinction. North Am J Med Sci 2011; 3: 562-564.

10. Elnar A. Male genital tract infection: the point of view of the bacteriologist. Gynecol Obstetrique Fertili 2005; 33(9): 691-697.

11. Ibadin OK, Ibeh IN. Bacteriospermia and sperm quality of in infertile male patient at University of Benin Teaching Hospital, Benin city, Nigeria. Mala J Microbiol 2008; 4(2): 65-67.

12. Keck C, Gerber-Schafer C, Clad A. Wihelm C, Breckwoldf M. Seminal tract infections: impact on male fertility and treatment options. Hum Reproduct Update. 1998; 4(6) 891-903.

13. Li HY, Lui JH. Influence of male genital bacterial infection on sperm function. Zhonghoa Nan Ke Xue 2002; 8(6A):442-444.

14. Cheesbrough M. Medical laboratory manual for tropical countries. Vol. II. Microbiology, 2nd ed. University press. Cambridge. 1984:160-96.

15. Cowan ST, Steel KJ. Manual for the identification of medical bacteria. 4th ed. Cambridge University press. London. 1985: 217.

16. World Health Organization (WHO). World health organization laboratory manual for examination of human semen and sperm-cervical mucus interaction. 4th ed. Cambridge, UK. 1999. pp1-138.

17. Esfandiari N, Saleh RA, Aboos M, Rouzrokh A, Nazemian Z. Positive bacterial culture of specimen from infertile men with asymptomatic leukocytospermia. International J Fertil Wom Med 2002; 47 (6): 265-270.