

Bacteriology Of Urinary Tract Infection Among Patients With Acquired Immunodeficiency Syndrome In Jos Nigeria

G.T.A. Jombo MBBS, MSc, FMCPATH, D.Z. Egah MBBS, MSc, FMCPATH, J.A. Ayeni HND, FIMLT, MSC

Department of Medical Microbiology, Jos University Teaching Hospital, Jos, Plateau State, Nigeria.

ABSTRACT

Background: The study was set to find out the bacterial agents causing urinary tract infection (UTI) in acquired immunodeficiency syndrome (AIDS) patients.

Methods: Two hundred patients with AIDS on admission at the Jos University Teaching Hospital (JUTH) were recruited into this study. Urine sample was collected from each patient and processed. Other information was obtained with protocol questionnaire. The results were analyzed using Epi Info 6.

Results: The prevalence of UTI in AIDS patients was found to be 24% and control 10.6%. *Escherichia coli* were the commonest Gram-negative isolate followed by *Klebsiella* species. *Enterococcus* species was the commonest Gram-positive organism.

Conclusion: There should be extreme caution whenever the need arises to catheterize AIDS patients.

KEY WORDS: AIDS; Urinary infection; Bacteria.

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INTRODUCTION

Urinary tract infection (UTI) is noted as the commonest form of nosocomial infection^{1,2}. This infection can also be community acquired and hence is not uncommon in the general community³⁻⁵. It is also an established fact that in patients with acquired immunodeficiency syndrome (AIDS), there is an increased incidence of opportunistic infections involving different microbial agents and different organ systems of the body⁶⁻¹⁰. In non AIDS patients, the prevalence of UTI has been placed at 5.4%¹¹. This finding may not be the same in AIDS patients since the depressed immunity may amplify both the prevalence of this infection as well as the spectrum of bacterial agents involved. UTI in AIDS patients is becoming increasingly important due to findings of increased incidence of nephropathies in AIDS patients¹²⁻¹⁵ and chronic UTI could further worsen this unique complication of AIDS, hence the relevance of this study.

This study was therefore designed to find out the prevalence of UTI in AIDS patients, and the bacterial agents involved.

MATERIALS AND METHODS

Study Area / Sampling Method: The study was carried out at the Jos University Teaching Hospital (JUTH), Jos located in the north central part of Nigeria. Two hundred AIDS patients confirmed by Western blot method and with clinical features of AIDS as specified by CDC and WHO were selected by simple random sampling method. These patients were on admission in various wards of JUTH. A control group consisting of another 200 patients, age and sex matched, with no signs and symptoms of AIDS were similarly selected from the General Outpatient Department (GOPD) of JUTH. These attended the hospital for various other ailments.

Study Design: Consent was sought and obtained from the patients. A well structured questionnaire was self administered to respondents. A sterile universal bottle was supplied to each patient and advised only to open at the time of urine collection and first early morning urine was recommended. Patients were educated properly on the collection of 10 millilitres (mls) of midstream urine (MSU). The urine was stored in the refrigerator at about 8°C within 30 minutes of collection until when convenient for processing. A standard wire loop of 4mm internal diameter that held about 1/500 ml of urine was used to carry out bacterial count for significant bacteriuria.

Microscopy¹⁶: A drop of well mixed urine was placed on a clean glass slide and clean cover slip carefully applied. This was examined under X40 objective with good contrast, for pus cells and bacteria cells. Other incidental findings such as red blood cells, casts, crystals and parasites were equally sought for after centrifugation of the urine.

Culture and Incubation¹⁷: With the wire loop sterilized by flaming, the urine was inoculated into the following media- Cysteine lactose electrolyte deficient (CLED) agar, Blood agar and Chocolate agar. These were incubated at 36.5°C over night. Plates were appropriately read the following morning and Gram stain¹⁸ carried out on significant colonies. Biochemical tests were carried out based

on Gram's reaction as follows:- Gram-negative bacilli- Oxidase test, Indole reaction, Citrate utilization test, Urea hydrolysis test, Triple sugar iron (TSI) for sugar fermentation and motility test. Gram positive cocci- Catalase test, Coagulase test, Optochin test, Bacitracin test, Bile solubility test and Arginine Deaminase test. Gram-negative cocci- Oxidase test and sugar fermentation were available for use.

Purity plating was carried out on Blood agar plate where applicable.

Ethical Considerations

Ethical clearance for the study was sought and obtained from the ethical committee of JUTH.

Analysis of Results

Results were analyzed using statistical software Epi Info version 6, Chi square was used for comparison of associations and p values <0.05 were considered significant.

RESULTS

The prevalence of UTI in the AIDS patients was significantly higher than in the control group; 48 out of 200 (24%) compared to 21 out of 200 (10.6%) found among the control group $P < 0.05$ (Fig. 1).

The prevalence of infection was higher in those aged 20 to 49 years ($P < 0.05$). This age group accounted for about 55.3% of all the age group under survey from 0 to 79 years.

There was a higher prevalence of UTI in women compared to men. This was 76.3% (37 out of 48) in women compared to 23.7% (11 out of 48) in men. This finding was not statistically different from that of the control ($P > 0.05$).

Organisms isolated from the test cultures indicated that *Escherichia coli* accounted for 43.75% (21 out of 48) while *Klebsiella* was second with 14.60% (7 out of 48) of the total isolates. *Proteus mirabilis* was found in 10.4% (5 out of 48) of the isolates and *Citrobacter* and coagulase negative *Staphylococcus* species accounted for 2% (1 out of 48) of the infections each. *Pseudomonas* accounted for 8.3% (4 out of 48). *Staphylococcus aureus* 4.2% (2 out of 48), *Enterobacter*, 6.2% (3 out of 48) while *Enterococcus* accounted for 8.3% (4 out of 48) of the total infections found among the AIDS patients. *Enterobacter*, *Pseudomonas* and coagulase negative *Staphylococcus* species were not isolated from the control urine samples.

Among the control group, *Escherichia coli* accounted for 57.1%, *Klebsiella* 14.2%, *Proteus mirabilis* and *Staphylococcus aureus*, 9.5% each, while *Enterococcus* species accounted for 4.7% of the total infections.

There was no statistically significant difference in the frequency of occurrence of the organisms isolated in the AIDS patients compared to the control group ($P > 0.05$).

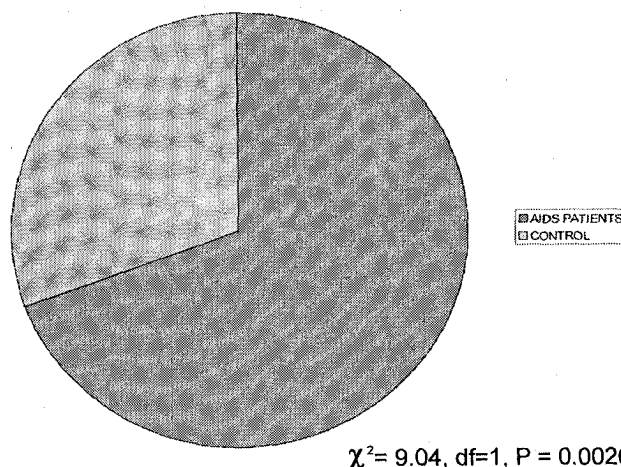


Fig. 1. Prevalence of UTI among AIDS and non-AIDS patients in Jos Nigeria.

DISCUSSION

This study was designed to find out bacterial agents that are commonly implicated in UTI in AIDS patients.

The study showed a higher prevalence of UTI in AIDS patients as compared to the control group. This is not surprising since in AIDS patients there is reduction in cell mediated immunity and the potency of antibodies is diminished. This leaves them more vulnerable to wide array of infections. Tolkoff-Rubin and Rubin¹⁹ in their study on immunocompromised individuals also showed a high prevalence of infection compared to immunocompetent hosts. The prevalence of UTI was similarly higher among females in the two (AIDS and non-AIDS) groups under study; this conforms to findings from other studies^{2,4}.

The study showed a higher infection rate in the age range of 20 to 29 years. This coincides with the peak age of HIV infection in our community and it is the most sexually active age group making them more predisposed to HIV infection²⁰. Also the vulnerability of this age range (20 - 29 years) predisposes them to a higher number of AIDS patents in the general population as previously reported^{21,22}. This leads to their massive turn up at various health centres including JUTH in search of medical attention.

There was a female predominance of UTI in the study as 76.3% of the infections were among females and 23.7% among their male counterpart

($P < 0.05$). This relationship was similar to that of the control since several authors in the past have reported a higher incidence of UTI in females compared to males¹.

Organisms isolated during the study showed a high prevalence of *Escherichia coli* (43.7%) comparable to that of control of 57.1% though the difference was not statistically significant ($P > 0.05$). Similar pattern was found with *Klebsiella*, *Proteus* and *Citrobacter*. *Pseudomonas*, coagulase negative *Staphylococcus* and *Enterobacter* species were only isolated in AIDS patients but not in the control group. This pattern is expected because in AIDS patients there is a high incidence of opportunistic infections.

In other immunosuppressed states other than AIDS such as protein energy malnutrition (PEM), studies carried out showed *Klebsiella* as the organism that ranked highest as the causative agent in UTI, followed by *Escherichia coli* and *Staphylococcus* in that order^{23,24}.

Among the Gram positive organisms this study showed that *Enterococcus* species were the commonest followed by *Staphylococcus aureus* and then coagulase negative *Staphylococcus*. The finding of coagulase negative *Staphylococcus* only in the AIDS patients in the study shows the relative susceptibility of this group of patients to this relatively harmless organism as a result of severe immunosuppression. There should be extreme caution whenever the need arises to catheterise AIDS patients.

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