

Original Research Article

Isolation and characterization of UTI pathogens from HIV positive patients of Karur District, Tamil Nadu, India

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ABSTRACT

Opportunistic infections including urinary tract infections are the predominant cause of morbidity and mortality among HIV infected patients. Persons living with HIV are prone to infection from non- pathogenic microbes in the environment than normal individuals; and this development has been greatly attributed to the weakened immune system of HIV infected patients which makes it difficult to protect the body against invading commensal organisms. In this study, urine samples from HIV infected patients in Karur district were evaluated by microbiological analysis for uropathogens. The uropathogens isolated from the HIV patients in this study were identified as *E.coli*, *Klebsiella pneumoniae*, *Klebsiella oxytoca*, *Proteus mirabilis*, *Serratia marcescens*, *Pseudomonas aeruginosa*, *Bacillus cereus*, *Staphylococcus aureus*, *Staphylococcus saprophyticus*, *Staphylococcus epidermidis*, and *Enterococcus faecalis*. Among the eleven pathogen, *Pseudomonas aeruginosa* was the most prevalent isolated organism.

Keywords

Uropathogens,
HIV patients,
Pseudomonas aeruginosa,
predominant

Introduction

Urinary tract infection is one of the most common infectious disease which has been extremely studied in the field of clinical practice (Dulawa, 2003). UTI is defined as the microbial invasion of any of the tissues of the urinary tract extending from the renal cortex to the urethral meatus (Kunin, 1979) and occurs in all age groups and in both genders (Orret and Davis, 2006, Omoregie *et al.*, 2008). People living with HIV are likely to be more predisposed to urinary tract infection due to suppression of their

immunity and women in this category tend to get them more often due to the nature of their human anatomy (Bakke and Digranes, 1991; Kayima *et al.*, 1996 and Kumamoto *et al.*, 2002). The infection is alarming due to the unique pathogenesis of the virus that decreases the CD4 cells, signalling the emergence of the opportunistic infection in the host (Joshi and Mishra,). Among the opportunistic infections, urinary tract infection account for 60% of the AIDS defining illness (De Pinho *et al.*, 1994). They are caused by various pathogenic

microorganisms such as bacteria, fungi and parasites (Hirschtick *et al.*, 1995). Recent studies revealed a broad range of bacteria causing UTIs in HIV infected patients, including the common uropathogens such as *E.coli*, *Proteus spp.*, and *Klebsiella spp.*, nosocomial organisms such as *Pseudomonas aeruginosa*, *Streptococcus spp.*, and *Staphylococcus aureus* and unusual microorganisms including *Candida spp.*, *Salmonella spp.*, *Acinetobacter spp.*, and *Cytomegalovirus* (Bansil *et al.*, 2007; Lee *et al.*, 2001; Schonwald *et al.*, 1999 and Ochei and Kolhatkar, 2007). More than 90% of UTIs are due to enteric gram negative organisms of which *Escherichia coli*, *Enterobacter*, *Proteus* and *Klebsiella* are commonly implicated. Almost all the causative organisms of UTIs originate from faecal materials or the periurethral environment (Muratani and Matsumoto, 2004). UTIs account for a large proportion of antibacterial drug consumption (Olson *et al.*, 2009). Because majority of the treatments are done factually, it is necessary to have a good knowledge of the causative organisms, their epidemiological characteristics and their antibacterial susceptibility profiles. The aim of the prevalence of isolated uropathogens from HIV infected individuals in Karur district of Tamil Nadu, India where no previous data on UTIs in HIV infected patients exist.

Materials and Methods

Sample Collection

Between November 2013 to May 2014, 40 urine samples were collected from HIV positive individuals in Karur district of Tamil Nadu and were investigated for the presence of uropathogens. The samples were transported to the Microbiology laboratory of St. Joseph's College, Autonomous, Tiruchirappalli, Tamil Nadu, where they were analyzed.

Processing and Identification

All urine samples were aseptically inoculated on Eosine Methylene Blue agar (EMB), Mac Conkey Agar and Blood agar. Plates were incubated for 24hrs at 37°. Suspected colonies on growth media were subcultured on to EMB, Mac Conkey Agar and Blood agar media and incubated for 24hrs at 37°. These were purified by sub culturing on to nutrient agar plates for further identification. Isolated colonies were identified by Standard microbiology identification techniques including Gram's staining, Indole, Methyl Red, Voges Proscauer, Catalase, Citrate, Urease and Triple Sugar Iron test.

Result and Discussion

In total 40 HIV positive patients were included in this study. The age of the patients ranged from 11 to 50 years. The age and sex wise distribution of HIV patients were depicted in (Table - 1). Uropathogens were detected in 40 samples of which 28 samples were from females and 12 samples were from male. The 31 urinary tract isolates from the patients included. 13 (41.9%) of *Pseudomonas aeruginosa* isolates, 6(19.35%) of *E.coli*, 3(9.6%) of *Staphylococcus epidermidis*, 2(6.45%) each of *Enterococcus faecalis* and *Staphylococcus aureus*, 1(3.2%) each of *Staphylococcus saprophyticus*, *Proteus mirabilis*, *Klebsiella pneumoniae*, *Klebsiella oxytoca* and *Serratia marcescens* and isolates of other organism including *Bacillus cereus*. Totally 10 urinary tract bacterial were isolated. Among the identified pathogens, *E.coli*, *Klebsiella oxytoca*, *Klebsiella pneumoniae*, *Serratia marcescens*, *Pseudomonas aeruginosa* and *Proteus mirabilis* were gram negative rods organisms. *Staphylococcus aureus*, *Staphylococcus saprophyticus*,

Staphylococcus epidermidis and *Enterococcus faecalis* were gram negative cocci. In this study, *Pseudomonas aeruginosa* was the predominant pathogen (41.9%) among the HIV patients of Karur district.

Urinary tract infection is one of the significant illness that cause burden on national archive. It is not only common Nosocomial infection but an important source of morbidity in community as well (Frank – Peterside *et al.*, 2013). There has been concern about the prevalence of urinary tract infections amongst HIV infected patients in recent times, thus we

investigated the occurrence of uropathogens among HIV positive individuals of Karur district in Tamil Nadu. Uropathogens were detected in higher numbers in females (81%) than in males (19%) in this study. The finding that females had higher prevalence of urinary tract infection than males agrees with earlier studies (Njunda, *et al.*, 2009; Aiyegoro, *et al.*, 2007; Anochie *et al.*, 2001 and Inyang – Etoh *et al.*, 2009). This is probably due to the anatomical structure of the female genital tract that makes them more susceptible to UTIs compared to males irrespective of their HIV sero status (Najar *et al.*, 2009).

Table.1 Age and Sex wise distribution of HIV (+) patients, n = 40

Age group (Years)	Male %	Female %	Total%
11-20	3 (7.5%)	2(5%)	5(12.5%)
21-30	3 (7.5%)	8(20%)	11(27.5%)
31-40	4(10%)	16(40%)	20(50%)
41-50	2(5%)	2(5%)	4(10%)
Total	12(30%)	28(70%)	40(100%)

Table.2 Uroathogens isolated from 40 HIV Positive patients

S.No	Opportunistic Pathogens	No of isolates	% of isolates
1.	<i>Pseudomonas aeruginosa</i>	13	41.9
2.	<i>Staphylococcus saprophyticus</i>	1	3.22
3.	<i>Escherichia coli</i>	6	19.35
4.	<i>Enterococcus faecalis</i>	2	6.45
5.	<i>Staphylococcus aureus</i>	2	6.45
6.	<i>Staphylococcus epidermidis</i>	3	9.67
7.	<i>Proteus mirabilis</i>	1	3.22
8.	<i>Klebsiella pneumoniae</i>	1	3.22
9.	<i>Klebsiella oxytoca</i>	1	3.22
10.	<i>Serratia marcescens</i>	1	3.22

Figure.1 Age and sex wise distribution of HIV positive patients

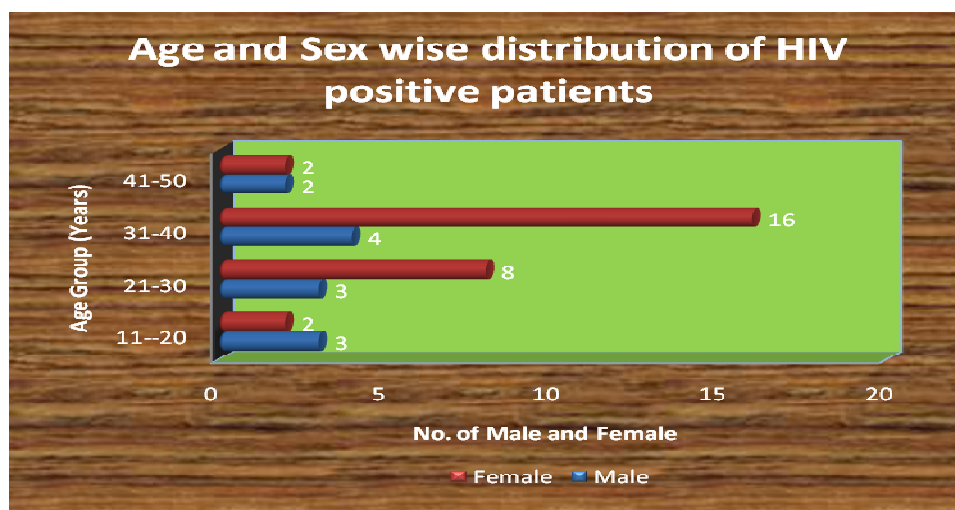
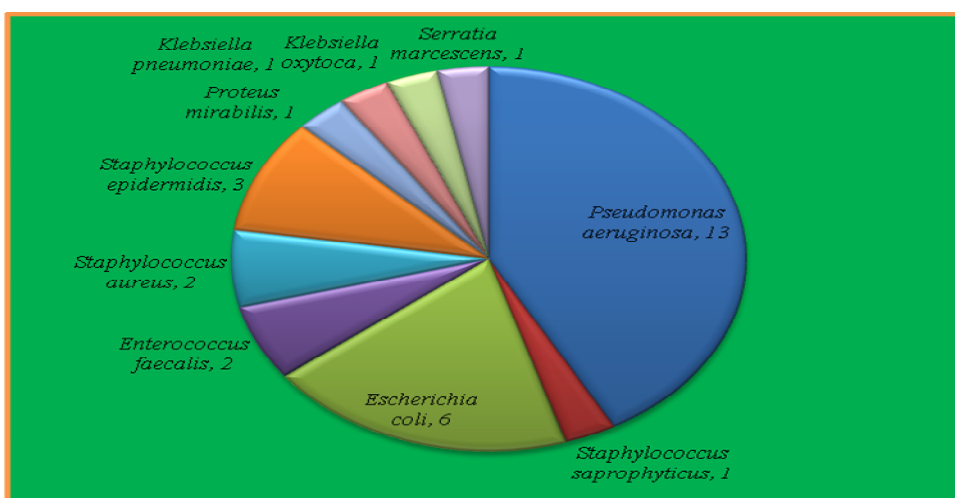


Figure.2 Isolated uropathogens from HIV positive patients



In the present study, *Pseudomonas aeruginosa* was the most predominant pathogen with over all isolation rates of 41.9%. This is in contrast to a study of Alemu *et al.*, 2013, where *E.coli* was the predominant pathogen with isolation rates of 47.5%. In this study, *E.coli* was the second highest isolate with 6 (19.35%). Out of six isolates five isolates were found in female patients. Urinary tract infections due to *E.coli* is a common finding in women and it is associated with microorganisms ascending from the periurethral areas contaminated by faecal

flora due to the close proximity to the anus and warm, moist thereby (Mwaka, *et al.*, 2011).

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