

Original Research Article

Prevalence of Urinary Tract Infections in the Elderly People in Khartoum State

Ashraf Hussein Adlan¹, Alshaikh Alobaid¹, Elamin Ibrahim El Nima¹,
Hisham Ali Waggiallah²

¹Faculty of Pharmacy, University of Khartoum, Khartoum, Sudan

²Department of Clinical Laboratory Science, Al-Ghad International Colleges for Health Sciences. Al Riyadh, Saudi Arabia

Corresponding Author: Hisham Ali Waggiallah

ABSTRACT

Aim: The current study was conducted to determine the prevalence of urinary tract infections (UTI) in elderly.

Methods: This prospective study was carried out in different hospitals in Khartoum state. This specimens were collected from 110 elderly people (61%) were elderly males, while 70 (39%) were elderly females with or without bacteriuria. Samples were examined for etiological diagnosis of bacterial and fungal urinary tract infection by quantitative cultivation of the urine with identification of the isolated organisms.

Results: The prevalence of UTI increases with age for both men and women, 64-69 y (n = 44 (37.2%) cases out of 118 cases), 70-79 y (n = 26 (60.4%) cases out of 43), 80-92 y (n = 12 (63.1%) cases out of 19). UTI in the elderly increases in women (n = 40 cases out of 70 cases (57.1%)), more than men (n = 42 cases out of 110 (38.1%)). Out of 82 bacteriuric subjects, (n = 59 (71.9%) were asymptomatic, (n = 23 (28.1%) were symptomatic.

Conclusion: We conclude that the prevalence of UTI increased with age for both men and women. UTI in the elderly increased in women more than men, and most of infections were asymptomatic

Key word: UTI, elderly people.

INTRODUCTION

Urinary tract infection is one of the most common infections in the elderly, and is reported to be the number one most frequent bacterial infections of older adults. [1,2] UTIs are the most frequent cause of sepsis and are the second most common cause of bacteremia in older adults. [3,4] With the projected increase in the proportion of the population over 65 years old in the upcoming decades, understanding the significance and appropriate management of urinary infection in this expanding elderly population will become of increasing importance.

Issues relating to management of urinary infection are of particular concern for this group. Some of these issues include ascertaining more precisely the attributable morbidity and mortality associated with this common problem, determining when it is desirable or feasible to attempt antimicrobial therapy, and issues relating to antimicrobial resistance and adverse effects in a population with a high burden of antimicrobial experience. [5] The elderly are not a homogeneous population. The degree of health and level of functional ability vary widely. As with any other issue relevant to this group, observations are seldom

universally applicable to all elderly populations. At one extreme are subjects who are well, fit, and active with no significant disease or economic or functional limitations to activity. At the other extreme are severely impaired, permanently institutionalized persons who require complete assistance. Considerations with respect to urinary infection and, likely, management approaches will differ depending on the health characteristics of the individual or population.

A subgroup of elderly individuals, most of whom are permanent residents of long-term care institutions, have voiding abnormalities management with chronic indwelling catheters. This subgroup with long-term indwelling catheters has a prevalence of bacteriuria of 100%, and morbidity and possibly mortality differ for elderly bacteriuric subjects with chronic indwelling catheters compared to bacteriuric subjects without catheters. [6] In particular, presence of a long-term indwelling catheter is associated with an increased likelihood of invasive infection, often secondary to catheter mucosal trauma.

MATERIALS AND METHODS

This prospective study was carried out in different hospitals in Khartoum state. This specimens were collected from 110 elderly people (61%) were elderly males, while 70 (39%) were elderly females with or without bacteriuria. Samples were examined for etiological diagnosis of bacterial and fungal urinary tract infection by quantitative cultivation of the urine with identification of the isolated organisms.

Sample collection:

Females were instructed to clean the area around the urethral opening with clean water, dry the area, and collect the urine with the labia held apart. Males were instructed to wash the hands before collecting the urine. All elderly were instructed after washing the external genitalia to pass the first portion of the urine into the toilet, collect the mid-portion of urine into the container and pass the excess

into the toilet. When immediate delivery to the laboratory is not possible, urine was either refrigerated at 4-6°C (not more than 2 hours) or 1% boric acid was added.

Methodology:

The isolation of the infecting organism was done by describing the appearance of the specimens macroscopically, examine the specimens microscopically, testing the specimens biochemically, culturing the specimens on enriched (Blood agar) and differential culture media (MacConkey agar). Culture is required when the urine contains bacteria (as indicated by the Gram smear), cells, casts, protein, nitrite, or has a markedly alkaline or acid reaction.

It is necessary to estimate the approximate number of bacteria in urine because normal specimens may contain small numbers of contaminating organisms, usually less than 10^5 per ml of urine. Urine from a person with an untreated acute urinary infection usually contains 10^5 or more bacteria per ml. The approximate number of bacteria per ml of urine can be estimated by using a calibrated loop. The method is based on accepting that a single colony represents one organism.

Identification of pathogens was done by aid of colonial morphology, Gram's stain, and biochemical tests. [7]

RESULTS

110 (61%) elderly males, 70 (39%) elderly females with or without bacteriuria were examined. The mean age of elderly was 69 years (range, 62-92 years).

Urine samples for direct microscopy, and culture were collected from all elderly (180 elderly). The urine specimens were processed for the isolation and identification of bacteria and fungi, and antibiotics susceptibility of the isolated bacteria.

The prevalence of UTI increases with age for both men and women, 64-69 y (n = 44 (37.2%) cases out of 118 cases), 70-79 y (n = 26 (60.4%) cases out of 43), 80-92 y (n = 12 (63.1%) cases out of 19). (Table1) UTI in the elderly increases in women (n =

40 cases out of 70 cases (57.1%)), more than men (n = 42 cases out of 110 (38.1%). (Table 2) Out of 82 bacteriuric subjects, (n = 59 (71.9%) were asymptomatic, (n = 23 (28.1%) were symptomatic. (Table 3) UTI in the elderly increased with incontinence voiding, prostatitis, urinary obstruction, stones, catheters, instrumentation, diabetes, immunocompromised subjects. Polymicrobial (mixed infection), showed (n = 14 cases (9 male & 5 female)), out of (n = 82 cases (17%). (Table 4)

The total number of the clinical isolates recovered from urine specimens from elderly with urinary tract infections was 99. On the basis of the results of identification tests using microscopical examination, cultures and biochemical tests, it was found that out of the 99 clinical isolates, 45(45.4%) were *Escherichia coli*, 12(12.1%) were *Enterococcus faecalis*, 10(10.1%) were *Staphylococcus saprophyticus*, 8(8.08%) were *Klebsiellapneumoniae*, 5(5.05%) were *Pseudomonas aeruginosa*, 5(5.05%) were *Candida albicans*, 5(5.05%) were

Staphylococcus aureus, 2(2.02%) were *Proteus mirabilis*, 2(2.02%) were *Serratialiquefaciens*, 2(2.02%) were *Citrobacterfreundii*, 1(1.01%) was *Enterobacter cloacae*, 1(1.01%) was *Providenciastuartii*, and 1(1.01%) was *Morganillamorganii*.The commonest organism isolated from urine specimens was *Escherichia coli*. (Figure 1)

Table 1: The prevalence of bacteriuria in elderly people:

| Age | Total number | Number of cases | Prevalence |
|---------|--------------|-----------------|------------|
| 64-69 y | 118 | 44 | 37.2% |
| 70-79 y | 43 | 26 | 60.4% |
| 80-92 y | 19 | 12 | 63.1% |

Table 2: The prevalence of bacteriuria in men and women.

| Sex | Total number | Number of cases | Prevalence |
|--------|--------------|-----------------|------------|
| Male | 110 | 42 | 38.1% |
| Female | 70 | 40 | 57.1% |

Table 3: The prevalence of bacteriuria according to symptoms.

| Bacteriuria | Total number | Number of cases | Prevalence |
|--------------|--------------|-----------------|------------|
| Symptomatic | 82 | 23 | 28.1% |
| Asymptomatic | 82 | 59 | 71.9% |

Table 4: The polymicrobial (mixed infection) of UTI in elderly people

| Infection | Total number | Number of cases | Prevalence |
|-----------|--------------|-----------------|------------|
| Single | 82 | 68 | 83% |
| Mix | 82 | 14 | 17% |

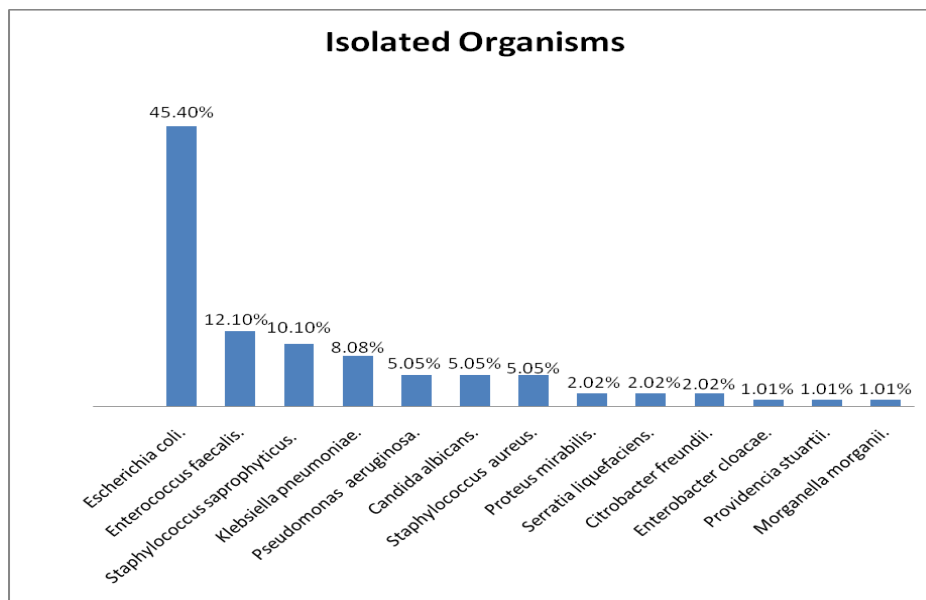


Figure 1: The percentage of clinical isolates recovered from urine specimens

DISCUSSION

UTI is one of the most common infections in the elderly, and are reported to be number one most frequent bacterial infections of older adult. [1,2] The elderly are

not homogeneous population. The degree of health and level of functional ability vary widely. At one extreme are subjects who are well, fit and active with no significant disease or economic or functional

limitations to activity. At the other extreme are severely impaired, who require complete assistance. [5] The prevalence of UTI increases with age for both men and women. [8] In this study the prevalence of UTI in the elderly increased with age 64-69 y, (no=44, (37.2%), cases out of 118 cases). In the age 70-79 y, (no=26. (60.4%), cases out of 43 cases). By the age 80-92 y, (no=12, (63.1%), out of 19 cases). As a general observation, prevalence of bacteriuria is approximately 3 times higher in female than male elderly populations. [9,10] In this study the prevalence is 2 times higher in female than male elderly populations. In female (n=40 (57.1%) cases out of 70 cases). In male (n=42 (38.1%) cases out of 110 cases). The reasons for increased prevalence of bacteriuria in the elderly are not well studied. Multiple factors likely contribute. Aging-associated changes such as immune dysregulation or endocrine changes may promote the occurrence of bacteriuria. For example, estrogen deficiency, [11] a decrease in the bactericidal activity of prostatic fluid with aging. [12] The ascending route of infection, with organisms colonizing the periurethral area and subsequently ascending to the bladder, is the major route of infection for all ages. The initial reservoir for potential uropathogens is the gut and, for women possibly the vagina. [13]

The associated diseases that occur with increased frequency in the elderly are certainly important contributing factors to the burden of bacteriuria. Diabetes increases markedly with age and is associated with a three times increased prevalence of bacteriuria in diabetics compared with nondiabetics women. [14] In this study we found increased prevalence of bacteriuria, two times in diabetics elderly compared with nondiabetics elderly. The neurologic diseases of the elderly are likely major promoters of bacteriuria. For men, prostatic hypertrophy and obstruction with increased residual urine are a major contributor to the increased prevalence of bacteriuria. The majority of elderly subjects with bacteriuria are asymptomatic. Episodes of symptomatic

infection do occur but infrequently relative to high prevalence and incidence of bacteriuria. [13] In this study, out of 82 bacteriuric subjects, (n=59 (71.9%) were asymptomatic, and (n=23 (28.1%) were symptomatic.

Escherichia coli is the most common community-acquired infecting organism. Its frequency relative to other organisms is likely decreased in the elderly compared to younger populations; it was isolated in about 85 percent of infections. [15] In this study *Escherichia coli* isolated in about 54.8 percent of infections.

Gram-positive organisms appear to be isolated more frequently in men. Coagulase-negative *Staphylococci* are frequently isolated in urine culture as well as *Enterococcus faecalis*. [16] In this study *Enterococcus faecalis* isolated in about 14.6% of infections, and coagulase-negative *Staphylococcus* isolated in about 12.2 % of infections.

Organism such as *Klebsiella pneumoniae*, *Citrobacter freundii*, *Morganella morganii*, *Providencia* species, and *Pseudomonas aeruginosa* are frequently identified. [17] In this study *Klebsiella pneumoniae* isolated in about 9.7 percent of infections, *Pseudomonas aeruginosa* isolated in about 6 percent of infections, *Candida albicans* isolated in about 6 percent of infections, *Staphylococcus aureus* in about 6 percent of infections.

Polymicrobial bacteriuria is common. It is identified in one-quarter to one-third of the bacteriuric institutionalized elderly but occurs less frequently in the non-institutionalized elderly. In this study polymicrobial bacteriuria (mixed infection) was isolated in about 17 percent (it is identified in one-six to one-five of the bacteriuric elderly).

The predisposing factors contributing UTI in the elderly showed to be incontinence voiding, prostatitis, urinary obstruction, stones, catheters, instrumentation, diabetes, immunocompromised subjects.

Organisms of increased antimicrobial resistance are more common in the hospitalized population. This is the result of several contributing factors including the high intensity of antimicrobial use, large reservoirs of bacteria, and facilitation of transmission by close staff and resident contact within the hospitals.

CONCLUSION

We conclude that the prevalence of UTI increased with age for both men and women. UTI in the elderly increased in women more than men, and most of infections were asymptomatic.

REFERENCES

1. Yoshikawa TT, Nicolle LE, Norman DC. Management of complicated urinary infection in older patients. *J Am Geriatr Soc* 1996;44:1235-1241.
2. Nicolle LE. Urinary tract infections in the elderly. In:Hazzard WR, Blass JP, Ettinger WH, Halter JB, Ouslander JG, eds. *Principles of Geriatrics Medicine and Gerontology*, 4th ed. New York: McGraw-Hill, 1999;823-833.
3. Yoshikawa TT. Unique aspects of urinary tract infections in the geriatrics populations. *Gerontology* 1984;30:339-344.
4. *Geriatrics Review syllabus. A Core Curriculum in Geriatrics Medicine*, 3rd ed. New York: American Geriatrics Society, 1996;268-269.
5. Kemper, P, and Murtaugh, CM. Lifetime use of nursing home care. *N Engl J Med* 1991;324:595.
6. Warren, JW. Catheter-associated urinary tract infections. *Infect Dis Clin North Am.* 1987; 1:823.
7. Mackie & McCartney practical medical microbiology.14th ed. Churchill Livingstone edition.1996; 17-30
8. Kaye, D. Urinary tract infection in the elderly. *Bull NY Acad Med* 56:209, 1990.
9. Sourander, LB. Urinary tract infection in the aged. *Ann Med Intern Fenn* 1966; 55(45):7.
10. Abrutyn, E, et al. epidemiology of asymptomatic bacteriuria in elderly women. *J Am Geriatr Soc.* 1991; 39:388.
11. Brandeberg, A, Mellstrom, D, and Samsioe, G. Low dose oral estriol treatment in elderly women with urogenital infection. *Acta Obstet gynecol Scand [Suppl] S.* 1987; 140:33.
12. Stamey, TA,et al. antibacterial nature of prostatic fluid. *Nature.* 1968; 218:444.
13. *Geriatric Urology (Pat D. Ó Donnell), Urinary Tract Infection.* By Lindsay E. Nicolle.Zhanel, G, Harding, GKM, and Nicolle, LE. Asymptomatic bacteriuria in diabetes. *Rev Infect Dis.* 1991; 13:150.
14. Boscia, JA, Kobasa,WD, and Knight, RA. Epidemiology of bacteriuria in an ambulatory population. *Am J Med.* 1986; 80:208.
15. Nicolle, LE, Hoban,SA, and Harding, GKM. Characterization of coagulase negative staphylococci from urinary tract specimens. *J ClinMicrobiol.* 1983; 17:267.
16. Gaynes, RP, et al. Antibiotic resistant flora in nursing home patients admitted to the hospital. *Arch Inter Med.* 1985; 145:1804.
17. Nicolle, LE, Mayhew, WJ, and Bryan, L. Prospective randomized comparison of therapy and no therapy for asymptomatic bacteriuria in institutionalized elderly women. *Am J Med.* 1987; 83:27.

How to cite this article: Adlan AH, Alobaid A, El Nima EI. Prevalence of urinary tract infections in the elderly people in Khartoum state. *Int J Health Sci Res.* 2017; 7(8):150-154.
