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ORIGINAL ARTICLE

Current Trends in Nosocomial Associated UTI (NAUTI) in Urology Ward

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ABSTRACT

Background: Nosocomial associated urinary tract infections are common, which not only causes morbidity and mortality but also increases cost of health related expenditure in urology patients.

Such infections are more difficult to treat because of presence of risk factors e.g. stone, reduced kidney functions. Limited studies are available which focus on type of organisms involved in NAUTI and their presentation in urology departments.

Objective: To determine the proportion of microorganisms involved in Nosocomial associated urinary tract infections (NAUTI) and their presentations in urology ward.

Methods: This cross-sectional study was conducted in Dubai Hospital in Dubai UAE, from 2017-2018. All patients, who were admitted in urology department with negative urine cultures, were included in study. Urine cultures were sent at time of discharge and a week after discharge from hospital. Patients were followed up in outdoor at first and second week.

Results: Total 475 patients were included in this study in given time period. 315(66.31%) patients were male and 160(33.68%) patients were female. On their first follow up after a week,

Urine cultures, which were sent at discharge time reveals,73(15.36%) patient's urine cultures were positive, out of them 21(28.76%) were Mixed Bacterial Growth (MBG).

E.coli was most common organism 20(27.39%) in which 11(15.06%) were ESBL positive, klebsiela 9(12.32%) in which 4(5.47%) were ESBL positive. Other organisms include Psuedomonas 4(5.47%), candida 16(21.91%) and enterococcus 3(4.11%). Frequency of candida was second highest, probably because of use of antibiotics during admission.

Conclusion: Prevalence of NAUTI in urology is 19.79% (94/475 patients). Enterobacterale species were main responsible organisms for NAUTI in Urology ward. E.coli was most common organism isolated and klebsiela was second most common.

Key words: Nosocomial UTI, ESBL UTI, Urology ward

INTRODUCTION

Urinary tract infection is an inflammatory response of the urothelium to bacterial invasion that is usually associated with bacteriuria and pyuria. Normally, Under normal circumstances, the urinary tract is sterile, but UTI can occurs because of ascend of bacteria from rectal reservoir. Urinary tract infections (UTIs) can occur in both sexes and in all ages, and their clinical features and outcomes are different. They can cause significant morbidity and mortality[1].

UTIs can occur as community acquired or hospital acquired (NAUTI) OR Health care associated infection (HAI). Hospital acquired infection can be defined as an infection which develops 48 hours after hospital admission or within 48 hours after being discharged[2], that was not incubating at the time of admission at hospital[3]. OR Any infection appear in a patient under medical care in the hospital or other health care facility which was absent at the time of admission[4].

Nosocomial infections can occur during healthcare delivery for other diseases and even after the discharge of the patients. Additionally, they comprise occupational infections among the medical staff [5]. In modern health care, Invasive devices such as catheters and ventilators are often associated to these infections.[6] Incidence of these infections is around seven percent in developed countries and ten percent in developing countries[7]. These types of infections can increase in hospital stay; cause long term disability, increased antimicrobial resistance, increase in socio-economic disturbance, and increased mortality rate.

The most frequent types of these infections include central line associated bloodstream infections (CLABSI), catheter-associated urinary tract infections (CAUTI), surgical site infections (SSI) and ventilator-associated pneumonia (VAP). CAUTI is the most frequently occurring hospital acquired infection globally[8].

Bacteria, Viruses and Fungal parasites are responsible for nosocomial infections. These microorganisms vary depending upon different patient populations, medical facilities and even difference in the environment in which the care is given.

Factors that can lead to nosocomial infections, depends upon the patient condition, susceptibility hospital environment in which care is delivered, and the lack of awareness of such prevailing infections among staff and health care providers, Prolong stay in intensive care unit, and prolong use of antibiotics, Poor knowledge of basic infection control measures and prolong catheterization.[9]These risk factors are associated with poverty, lack of financial support, understaffed health care settings and inadequate supply of equipment in low income countries.[5]

Microorganisms living in the healthcare environment can be transferred directly to patients, by hands, body fluids, water, food, and equipment.by this transfer they can infect another patient.[10]

Because of significant morbidity and mortality, Nosocomial infections need to be prevented from the base line so that their spread can be controlled.

Maintenance of Personal hygiene is of paramount importance for everyone, so staff should maintain it. Use of disinfectants, proper hand washing techniques after being in contact with patients, face mask, gloves, sterilized equipment can help in prevention of infections.[11]

MATERIAL AND METHODS

Study was conducted in department of Urology Dubai hospital Dubai from Jan 2017-feb 2018. Dubai Hospital is 400 bedded tertiary care facilities in Dubai. Urology department in Dubai hospital deal mainly in adult urology. All patients who were electively admitted in urology department with negative urine culture were included in this study. Pediatric population was excluded from this study. Nosocomial Infection can occur more than 48 hours of hospital stay. Patients on 1-week follow up with positive urine cultures will be counted in nosocomial as average incubation period of organism in our study was 7 days all patients. Urine cultures were sent at time of discharge and after a week on follow up in outdoors. All urine cultures were done at same hospital laboratory.

RESULTS

Total 475 patients were included in this study in given time period. 315(66.31%) patients were male and 160(33.68%) patients were female. On their first follow up after a week, 73(15.36%) patient's urine cultures were positive for infection on first culture at time of discharge and 21(4.42%) more patients got urine culture positive on repeat cultures in outdoor clinic. 381(80.21%) were remained negative throughout study period and total 94(19.79%) patients got NAUTI with 95% confidence interval from 17.4 to 22.4%.

16 patients got candida +ve on discharge probably due to antibiotics during hospital stay.

Half of the Candida became –ve itself as patient put off from antibiotics. 5 candida persisted and 3 transformed into E. Coli ESBL and Enterococcus…This transformation of organisms seen in older ages between 30 -70 but not in 15 – 30 age group, may be due to increased co-morbid and LUTS.

Male to female ratio was 1:3…. Male Candida was 100% eradicated on Follow up but only 33% Female managed to get rid of it.

14 out of 16 cases of Candida lied 15 to 50 age group; all cases in 15-30 age group became negative; 100% persistency showed in older ages i.e. 50-70age group, might depends on the level of immunity and hygiene according to age.

Total 10 Candida came positive on Follow up [5 persistent candida, 3 new cases seen only in females, 2 became Candida +ve from MBG previously on Discharge as it could be previously contaminated revealing MBG]

Table 1: Urine culture at Discharge:

Positive cultures with Isolated Organism				52			
Mixed growth/contamination				21			
E.coli		Klebsiela		Psuedomonas	Candida	Enterococci	Total
ESBL	Non ESBL	ESBL	Non ESBL	04	16	03	52
11	09	04	05				

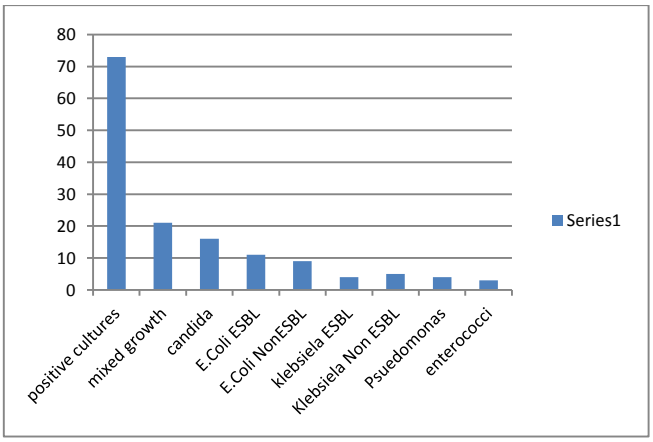
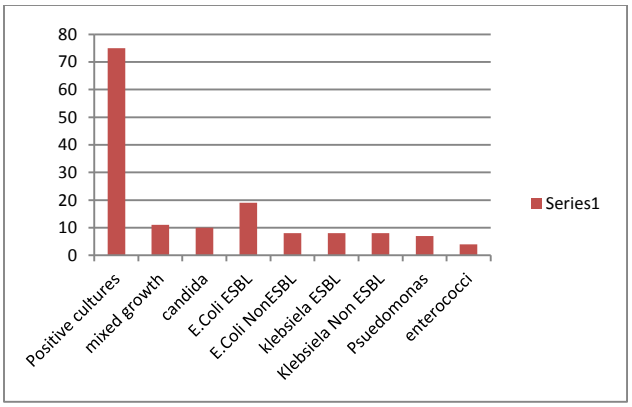


Figure 1:

Table 2: Urine culture at Follow up

Positive cultures with isolated organism in naïve patients				15			
Mixed growth/contamination				6			
Positive cultures Overall				64			
Mixed growth/contamination				11			
E.coli		Klebsiela		Psuedomonas	Candida	Enterococci	Total
ESBL	Non ESBL	ESBL	Non ESBL	07	10	04	64
19	08	08	08				



Clinical presentation:

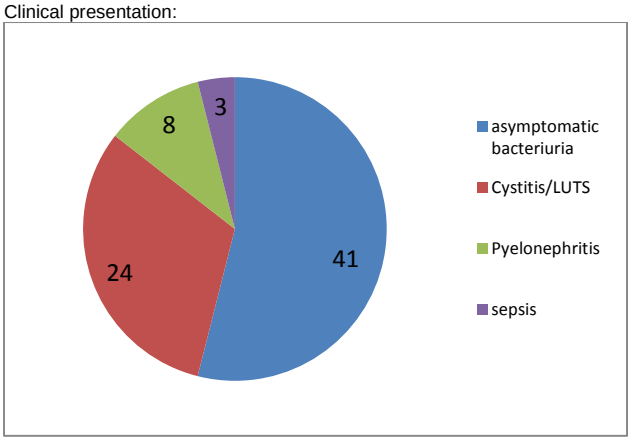


Figure 2:

DISCUSSION

In recent time, Nosocomial infections become a challenge to health care system, with especial concerns expressed over antimicrobial resistance present in organisms causing such infections[12].

Urinary tract infections are reported as one of common cause of health associated infections among adults in hospitals and in critical care units. [13,14]

Nosocomial UTI are common and probably one of the most preventable complications during hospitalization that not only increases health care costs but also increase morbidity and mortality.[15]

Patients in urology departments are usually at higher risk of infection because most of them either already carries risk factors for urinary infections, OR they undergo urinary tract instrumentation, as most of urological procedures are performed by endoscopy. After all indwelling catheter is kept in almost all urological procedures for variable time in post-operative period.[16,17,18]

Nosocomial infections show different characteristics, as compare to other types of infections. The microbiological pattern involved in community-acquired infections is different from that shown by hospital acquired infections. Some microorganisms are typically considered notorious for nosocomial infections; such as Pseudomonas aeruginosa.[19]

E,coli represent up to 70-80% of causative organisms in community acquired infections but it is less than 50% in hospital acquired infections.[20]

This fact highlight the significance of knowledge of the microbiological spectrum and resistance patterns in the particular area related to the type of infections according to patient characteristics. Therefore, to achieve the highest success rate in treatment, local protocols can be developed and patient profiles can be created accordingly.[21]

As discussed, Nosocomial infections can occurs after discharge of hospital, so we took a culture at time of discharge from hospital and second culture after one week of discharge.

In our study we found, 19.79% patients were positive for various infections after discharge from hospital. This incidence is similar to other international studies. Di Pietrantonj C and Cek M in their Studies, from medical and surgical wards of different hospital units, reported that urinary tract infections represent 15% to 57% of HAIs.[22,23]

The incidence of HAIs in urology units was found to lie between 5% and 14% according to the results of the Pan European Prevalence (PEP) study and Pan Euro-Asian Prevalence (PEAP) study.[24,25]

Clinical presentation of NAUTI is variable in different studies. We found, asymptomatic bacteriuria was most common presentation 54%, cystitis was second most presentation 33%, pyelonephritis was present in 11%, and sepsis was documented in 2%. None of our patient present with prostatitis.

Khaireddine Bouassida et al reported, Asymptomatic bacteriuria was the most common type Clinical presentations of NAUTI, accounting for 60.1% , followed by pyelonephritis at 27.9 %. Urosepsis was found in 8.3% of patients and cystitis in 2.2% [13].

Wagenlehner F et al reported in GPIU study, lower tract symptoms or cystitis was most common presentation 27%, pyelonephritis and asymptomatic bacteriuria were second most common presentation with 21% in each. Urosepsis 19% and accessory gland infection in 12%.[26]

Medina-Polo J et al reported 24.6% incidence of E.coli, 17.5% pseudomonas spp, 16.7% Enterococcus spp, 15.1% Klebsiela spp, 9.5% candida and 4.8% enterobacter spp [21].

Tandogdu Z et al reported incidence of NAUTI in urology ward, they also found E.coli as most commonly isolated organisms 39.7%, Enterococcus spp were second most common 11.5%, followed by Klebsiella spp 11.1%, Psuedomonas aerogenosa 10.8%, enterobacter spp 5.4% [27].

In our study (taking naïve patients into an account at the time of discharge and follow ups) we found Enterobacterales were main culprits for NAUTI, E.coli was most commonly found organism (23/94) 24.4% with 11 of them were positive for ESBL, which is comparable to other studies. Klebsiela was second most isolated organism (15/94) 15.95% include 5 ESBL positive, which is slightly higher than other studies and Pseudomonas (6/94) 6.38% was also in comparable range in other studies. Incidence of candida was (19/94) 20.21% which is higher than some international studies. Kayo Osawa1 et al reported incidence of candida UTI in urology in range of 5-11% [28]. 14 out of 16 cases of Candida lied 15 to 50 age group; all cases in 15-30 age group became negative; 100% persistency showed in older ages i.e. 50-70 age group, might depends on the level of immunity and hygiene according to age. Enterococcus prevalence was (4/94) 4.2%. Wazait HD et al reported prevalence of 22% from UK and another study by Medina-Polo J et al reported prevalence of 15.5% [29,21].

11 patients who were positive for E. Coli ESBL at the time of discharge were still got positive urine cultures for E.Coli ESBL again at their first follow up. 3 patients with MBG, 2 with candida and 3 with E.Coli non ESBL at the time of discharge were then positive for E. Coli ESBL at their follow up making a total of 19 E.Coli ESBL at follow up.

Among all infections, we noticed (16/94) 17.02% organisms were ESBL positive.

In data from international studies, 59% ESBL producing infections reported from southern Europe.[30]

ESBL producing organisms are mostly resistant to conventional antimicrobials as compare to Non ESBL organisms. Hospitalized patients, with past history of UTI and antibiotics are main risk factors for emergence of ESBL and resistance. Another risk factor is indwelling urinary catheters, for longer duration. All of ESBL positive organisms were treated with carbapenems. Our study has some limitations. We focused only on type of organism involved and their presentations did not focus on antibiotic resistant pattern. Further detailed studies with antimicrobial resistance and antibiogram would be more beneficial to understand NAUTI and its effective treatment.

CONCLUSION

Nosocomial associated urinary tract infections are common in Urology ward, is major health risk factor. This not only causes morbidity and mortality but also increases cost of health related expenditure in urology patients. Such infections are more difficult to treat because of presence of risk factors e.g. stone, reduced kidney functions.

In conclusion we found 19.97% 94/475 patients of NAUTI. Enterobacterale species were organisms responsible for NAUTI in Urology ward. E.coli was most common organism isolated and klebsiela was second most common. Among all 3.37% (16/475 naïve patients) of organism were ESBL producing which are notorious for multidrug resistance. Majority of our patient were suffering from asymptomatic bacteriuria but nearly half of infected patients were not only symptomatic but some of them have very severe and serious infection which can be life threatening. Knowledge of the microbiological spectrum and resistance patterns and type of infection according to patient is of utmost importance. Therefore, to achieve the highest success rate in treatment, local protocols can be developed and patient profiles can be created accordingly.

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