URINARY TRACT INFECTION IN TERTIARY CARE HOSPITAL IN KERALA AND BURKHOLDERIA CEPACIA IN UNCOMPLICATED UTI

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ABSTRACT

BACKGROUND

Burkholderia cepacia complex urinary infections are mostly reported in patients who had undergone procedures in hospital set up by contact with contaminated catheters or gel used for lubricating the catheter. Here with present isolation of Burkholderia cepacia complex in patients of uncomplicated UTI who did not have previous history of intervention in the urinary tract.

MATERIALS AND METHODS

For reviewing the anti-microbial profile of the urinary pathogen, study was conducted on 1000 consecutive urine samples received in Clinical Microbiology laboratory. Samples were collected from the patients who presented to the outpatient department and from those who were admitted. Samples received included routine antenatal screening urine samples and samples collected from patients undergoing elective surgical procedures. Sterile wide mouthed urine containers used for collection of mid-stream urine.

RESULTS

Out of 1000 urine samples studied, 192 pure isolates satisfying significant urinary pathogen. Antibiotic susceptibility of all the isolates documented with Whonet 5.6. No pathogen could be separately isolated in 165 samples which yielded mixed growth due to probable contamination with perineal flora by improper collection of the urine sample.

Bacterial isolates obtained included Escherichia coli, Klebsiella sp. Enterococci and Pseudomonas isolated commonly in the order. Fungi isolated were predominantly non-albicans Candida species.

CONCLUSION

Antimicrobial surveillance plays a definite role in containment of resistant strains of bacteria causing urinary infections. Proper awareness among the health care providers regarding the spread of antibiotic resistance lead to rational prescription practices. Public awareness need to be emphasized through lay media about the unscrupulous self-medication which is contributing to resistance. The public needs to be re-assured about the nature of the condition that waiting for the antibiotic susceptibility study would not cause any excess signs and symptoms and damages.

KEYWORDS

Burkholderia cepacia, uncomplicated UTI.

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BACKGROUND

Govt. Medical College, Kottayam situated in Kerala is catering to hilly area in three districts. Most of the patients are referred from suburban health care facilities. A study was conducted to find out the prevalent organism responsible for Urinary tract infections and antibiotics most suited for management of UTI. Here with present 3 isolates of Burkholderia cepacia complex in patients of whom only one had previous history of a urinary intervention.

Burkholderia cepacia complex Urinary infections are nosocomial infections mostly reported in patients who had undergone procedures in hospital set up by contact with contaminated catheters or gel used for lubricating the catheter.[1] Affect any age group in whom various predisposing factors are present.[2] But in this study, among the 3 isolation of B.cepacia complex there were two patients who had no history of any such urinary catheterization or any predisposing conditions leading to a nosocomial cause.

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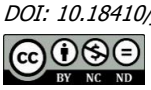

MATERIALS AND METHODS

For reviewing the anti-microbial profile in urinary pathogen, study was conducted in 1000 consecutive urine samples received in Clinical Microbiology laboratory. Samples were collected from the patients presented to the outpatient department and from those who were admitted. Samples received included Routine anti-natal screening urine samples and samples collected from patients undergoing elective surgical procedures. Sterile wide mouthed urine containers used for collection of mid-stream urine. From the patients with indwelling urinary catheter samples were collected as per the guideline. Foley's catheters available in the hospital

were not having a collection port. So, samples collected by aspiration by syringe and needle from the part of the catheter above the connection to the urine collection bag.

All the urine samples were streaked on to Blood agar and MacConkey agar using semi quantitative culture method. Standard loop which can hold 0.001 ml of urine sample were used for plating and colonies are counted. Each viable organism act as colony forming units (cfu) and grow to form visible colonies which can be counted. Growth in the culture media identified presumptively by colony appearance and further by Gram's staining of the colony smear and biochemical reactions

Bacterial isolates satisfying the criteria of significant bacteriuria were further put for antibiotic susceptibility test by Kirby Bauer disc diffusion method

Isolates obtained listed in table.

Identity of B. Cepacia complex was established by conventional culture and biochemical reactions. One of the isolate was confirmed identity by Vitec 2 system. Since institution does not have molecular diagnostic facility further confirmation could not be established.

Description of the Isolate

- Growth on Blood Agar: Non-haemolytic round grey smooth moist colonies.
- Growth on MacConkey's agar: Non-Lactose Fermenting colony.
- Hugh Leifson's Oxidation Fermentation Test- Oxidative pattern.
- Gram stain showed Gram negative Bacilli with bipolar staining.
- Oxidase positive.
- Polymyxin B (300 IU)- Resistant.
- Urease not produced.
- Arginine not hydrolysed.
- Aesculin not hydrolysed.
- Isolate conventionally identified as Burkholderia cepacia complex.
- Isolate identity is confirmed by VITEK 2 system as Burkholderia cepacia (88% identity).

RESULTS

Out of 1000 urine samples studied 192 pure isolates satisfying significant urinary pathogen. Antibiotic susceptibility of all the isolates documented with Whonet 5.6. No pathogen could be separately isolated in 165 samples which yielded mixed growth due to probable contamination with perineal flora by improper collection of the urine sample

Bacterial isolates obtained included Escherichia coli, Klebsiella sp. Enterococci and Pseudomonas isolated commonly in the order. Fungi isolated were predominantly Non albicans Candida species

Antibiotic susceptibility plates were set using Kirby Baeur method on Mueller Hinton agar where zone of inhibition of the growth measured and recorded and data entered in WHONET database. In the instances of multiple drug resistant strains another plate is set Stokes method of disc diffusion technique where zone of inhibition interpreted in comparison with the standard strain as sensitive or resistant.

Significant Isolates	192
No Bacteriuria	449
No Signif. Bacteriuria	194
Mixed Growth	165
Total Specimen	1000

Table 1

Organism	No. of Isolates	No. of Patients	f	m
Acinetobacter sp.	4	4	3	1
Burkholderia cepacia complex	3	3	1	2
Candida albicans	1	1		1
Candida sp.	10	10	8	2
Escherichia coli	90	90	48	42
Enterococcus sp.	19	18	9	9
Escherichia sp.	1	1		1
Klebsiella sp.	47	45	22	23
Pseudomonas aeruginosa	15	14	6	8
Staphylococcus aureus ss. aureus	2	2	2	

Table 2

Antibiotic resistance rate of uropathogenic bacteria.

Ampicillin	95.7%
Cefazolin	85.2%
Ciprofloxacin	64.2%
Norfloxacin	71.7%
Cotrimoxazole	67.5%
Amikacin	22.1%

Table 3

Age wise distribution of the isolates

Organism	5y & <5	6y to 18	19y to 40	41y to 60	>60
Acinetobacter sp.	1	0	2	0	1
Candida sp.	2	1	0	3	4
Candida albicans	0	0	0	1	0
Escherichia coli	22	10	22	20	16
Escherichia sp.	1	0	0	0	0
Klebsiella sp.	9	4	13	11	10
Pseudomonas aeruginosa	0	0	5	5	5
Burkholderia cepacia complex	0	0	1	1	1
Staphylococcus aureus	0	0	2	0	0
Enterococcus sp.	5	3	5	2	4

Table 4

DISCUSSION

Urinary tract infections occur more frequently in the community due to various factors. Many of the UTI remain asymptomatic and are only incidental finding while investigating for some other diagnostic purpose. Indiscrete use of antibiotics without doing antibiotic susceptibility studies increased the incidence of isolation of resistant strains. To make a rationale antibiotic policy it is highly essential that the resistance pattern of the common isolates well identified. WHONET program allows to document antimicrobial susceptibility of the organisms isolated. This program enables the comparison of antimicrobial profile of bacteria isolated at different samples collected at different locations in an institution and also between different centres. This program is playing a major role in the development and formulation of antibiotic policy. Many previous studies concluded that use of Ampicillin as single agent for empirical treatment for uncomplicated UTI would not cover majority of urinary pathogens. Empirical antibiotic treatment in urinary tract infection must have to rely on surveillance data on the epidemiology and resistance pattern of common urinary pathogen.[3]

Almost all the urinary pathogens are commonly isolated in other infections also. So knowledge of the resistance pattern of the urinary pathogens can be relied on selection of empirical antibiotics in other infections. This study was carried out with urinary tract infections because of the ease of getting urine samples and doing antibiotic susceptibility. Ever increasing antimicrobial resistance in the uropathogens has been focus of intensive study. If local uropathogen resistance rates to cotrimoxazole exceeds 10 to 25% empirical cotrimoxazole therapy should not be utilized. Now fluoroquinolone resistance also exceeded 10-25 % rendering empirical fluoroquinolone use problematic. With exception of fosfomycin single dose therapy is not recommended because, there would be sub optimal cure rate and subsequent relapse rate become high.

Many epidemiological surveys suggest that more than 75% of the antimicrobial use is within the community as against hospitals. Three quarters of these antibiotics are used for such illness majority of which would arguably not benefit from antibiotics. Theoretically antibiotic prescription can possibly reduce. Major components of these prescriptions fall in treatment of minor illness in children. Society need to be reassured that no harm would occur to these patients and that such reduced antibiotic usage would decline or atleast its relentless rise can be halted. A long-term relationship with lay media is essential for making change in the public opinion

For empirical management of UTI · lactam antibiotics are not recommended as there showed sub optimal clinical and bacteriological results as compared to non · lactams. If chosen · lactams should be given for 7 days. cotrimoxazole and fluoroquinolones can be administered in 3-day regimens. Second line drug Nitrofurantoin should have to be given for 7 days.[4]

Commonest isolates in different age groups were tabulated. E coli and Klebsiella isolated in most cases predominated in adults. It is found that Antibiotics which is suited for most of the infections in this study was aminoglycoside Amikacin followed it with Fluoroquinolones. Commonest isolates showed high rate of resistance to B lactam antibiotics, Cephalosporins, fluoroquinolones and Gentamicin. Similar to antimicrobial profile in various studies conducted elsewhere, this study also re iterates the emergence and sustained antibiotic resistance in organisms responsible for urinary infections. Most of the UTI found in the adult female population and frequently with E col, followed by Klebsiella most of them having empirical antibiotic treatment as the antibiotics are available over the counter. This resulted in the development of high rate of resistance to almost all the oral antibiotics as exemplified in this study.

Isolation of Burkholderia cepacia from uncomplicated urinary tract infection is unusual. 3 isolates obtained from 3 different age group one female and two males. One male patient had urinary catheterization 3 months previously but other two has no intervention of any sort in the urinary tract. Burkholderia cepacia complex (BCC) is the most antimicrobial-resistant organisms encountered in the clinical laboratory causes infections in respiratory tract especially associated with Cystic fibrosis. This refers to a group of organisms that can cause infection in people who are already sick especially with those illness that affects lungs such as pneumonia and cystic fibrosis. B. cepacia complex survive in water or disinfectants. Contaminated nebulized and intravenous medications and solutions linked to healthcare-associated outbreaks of B. cepacia complex infection.[5] They also isolated in conditions that include bacteraemia, peritonitis urinary tract infection and septic arthritis. Due to high intrinsic resistance these infections are very difficult to treat and, in some cases become fatal.[6] With the exception of pulmonary infection Burkholderia cepacia complex has a very low level of virulence and infection do not commonly result in death. Although the organism appears to be susceptible in vitro to piperacillin, broad spectrum cephalosporins and ciprofloxacin the general response is very poor.

B. cepacia can cause opportunistic urinary tract infection in catheterized patients. Usually the organism is susceptible to trimethoprim sulfamethoxazole which distinguish them from Pseudomonas aeruginosa which is uniformly resistant.

CONCLUSION

Antimicrobial surveillance plays a definite role in containment of resistant strains of bacteria causing urinary infections. Proper awareness among the healthcare providers regarding the spread of antibiotic resistance leads to rational prescription practices. Public awareness needs to be emphasized through lay media about the unscrupulous self-medication which is contributing to resistance. The public needs to be re-assured about the nature of the condition that waiting for the antibiotic susceptibility study would not cause any excess signs and symptoms and damages. Most of the time, physicians are forced to

prescribe antibiotics to be on safer side, but in fact it causes much harm than the benefits to the uncomplicated UTI patients as well as emergence of antibiotic resistant strains. It is imperative that right antibiotic at right time to the right patient saves the patient as well as the community from much hardships due to the infections. Policy for rational antibiotic prescription can be formulated only if the resistance pattern of various microorganisms is well elucidated by frequently analysing the antimicrobial profile in the health care settings. It is also important to ensure proper dosing once an antibiotic is initiated especially when combination of antibiotics is used. Proper monitoring of the response to the antibiotics will aid the proper scheduling of the antimicrobial therapy. This will ensure the unnecessary continual of the antibiotic curtailed.

Burkholderia cepacia complex cause UTI as nosocomial infection but can also lead to uncomplicated UTI as observed in this study. This study also gives insight to importance of proper collection and transport of urine for establishing UTI. High rate of contaminated urine sample as seen in the study is an indicator pointing to the improper urine collection procedure. Every attempt should be employed to bring this rate as much low as possible to ensure proper management of urinary tract infections. And also care should be taken not to miss out unusual pathogens as any organism which are considered harmless, have been associated with many of the unresponding illnesses especially when there is substantial population having immunocompromised status due to various infectious and non-infectious states and life style.

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