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COMMUNITY ACQUIRED UTI DEMOGRAPHIC AND CLINICAL PROFILE: A NEW INSIGHT!

Urology

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ABSTRACT

Purpose

Acute uncomplicated UTI (Community acquired UTI) is one of the most common problems for which patients seek medical attention to the urologist. In this era antibiotic resistance rising incidence of ESBL E. Coli is of great concern. Community acquired urinary infections that are usually considered to be susceptible to most of the commonly prescribed antibiotics

We have done a study to gain insights into the demographic and clinical patterns of community acquired Urinary tract infections

Materials and methods

We have done prospective and retrospective observational study in our tertiary care institute from the period Jan 2011 to Sept 2012 on 540 patients with community acquired urinary tract infections

Results

E. coli is the most common pathogen. The incidence of E.coli ESBL is rising (57%).Antibiotic resistance is increasing with TMP-SMX, Quinolones, Nitrofurantoin, B-lactam antibiotics. Aminoglycosides (17%) share least resistance with carbapenems (21%)

Conclusions

There is a rising incidence of resistance to commonly prescribed antibiotics even in community acquired setting

Nitrofurantoin should be used as a first line therapy to avoid cross resistance pending culture in community acquired setting

KEYWORDS:

Community acquired UTI, Antibiotic resistance, ESBL E.coli

Introduction

Acute uncomplicated UTI (Community acquired) is one of the most common problems for which patients seek medical attention to the urologist. It accounts for considerable morbidity and health care costs. [1]

In this era antibiotic resistance rising incidence of ESBL E. Coli that are resistant to commonly used B-lactam antibiotics is of great concern.

Community acquired urinary infections that are usually considered to be susceptible to most of the commonly prescribed antibiotics

We have done a study to gain insights into the demographic and clinical patterns of community acquired Urinary tract infections so as to answer "What should be the first choice antibiotic?" and to suggest at least best prescribing pattern. This will not only avoid unnecessary antibiotic usage but also provide quick relief to the patient

Materials and methods

We have done prospective and retrospective observational study

We have gathered data on urine cultures obtained on OPD basis in our tertiary care institute from the period Jan 2011 to Sept 2012

Sample size: 540 patients with urinary tract infections

Inclusion

Patients presenting to urology OPD with symptoms s/o UTI Viz. Dysuria, Frequency with or without hematuria and fever

Exclusion

History of recent admission or admitted patients

Patients who have received prior antibiotic treatment

Patients with indwelling catheters

The variables noted

Age, Sex, Infective Organism, Sensitivity/resistance patterns, Symptoms (Viz. Fever, dysuria, pain in suprapubic area),

Statistical analysis was done using Chi Square test and Odds ration was calculated to find out the correlation.

Observations and results

Sample Size-540

1] Organisms isolated

Non ESBL E.coli 215

ESBL E Coli - 124

Klebsiella Pneumonae- 83

Enterococci-57

Pseudomonas- 16

Acenetobacter-14

Streptococci -14

Marginella-8

Citrobacter-7

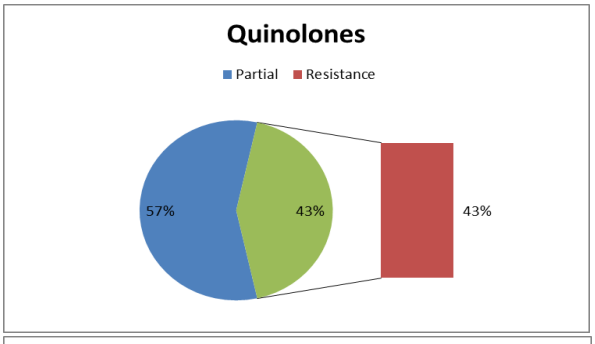
Miscellaneous (Maltophilia etc)-2

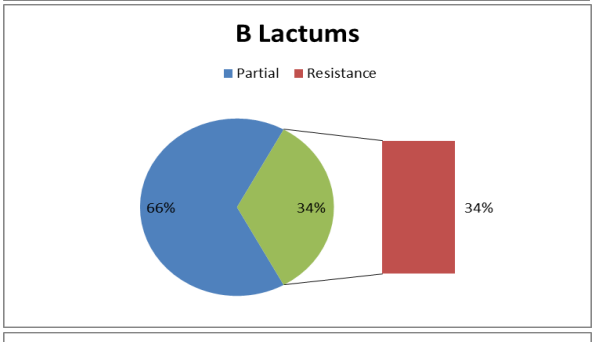
Antibiotic Group	Sensitive	
	Complete	Partial (%)
Aminoglycosides	260(44%)	280(56)
Quinolones	90(17%)	450(83)
B-lactums	127(24%)	413(76)
Carbenecillins	298(55%)	242(45)
Carbapenems	173(32%)	367(68)
Cotrimoxalol	225(42%)	315(58)
Nitrofurantoin	327(60%)	--

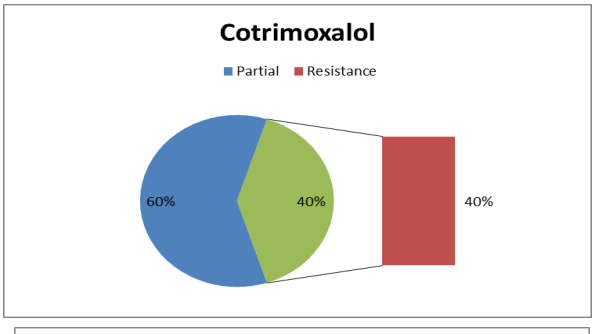
Antibiotic Group	Resistance	
	Complete	Partial (%)
Aminoglycosides	90(17%)	450(83)
Quinolones	230(43%)	310(57)
B-lactums	186(34%)	354(66)
Carbenecillins	127(24%)	413(76)
Carbapenems	113(21%)	427(79)
Cotrimoxalol	213(40%)	327(60)
Nitrofurantoin	213(40%)	--

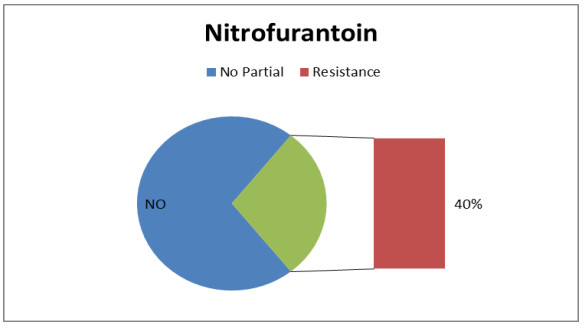
Complete Resistance/Sensitivity: Organism is resistant/sensitive to all molecules in the group Partial Resistance/sensitive: Organism is resistant/sensitive to one or more molecule in the group

Resistance patterns









Female/Male= 2.1 (368 Vs 172)
4] Co-morbid conditions

Presence of Co morbid conditions -369 patients
No Co-morbid conditions- 171

5] Symptoms
Presence of Symptoms- 456
Asymtomatic-84

Discussion

Complicated Urinary tract infection is defined set by conditions Viz. Pregnancy, elderly, and history of instrumentation or antimicrobial treatment, functional or anatomic abnormalities of the genitourinary tract. [2]

These conditions usually require admission and parenteral antibiotics Acute uncomplicated UTI (Community acquired) on the other hand, is one of the most common problems for which patients seek medical attention to the urologist. It accounts for considerable morbidity and health care costs (1)

It is a common dictum to use TMP-SMX/B-Lactam/Quinolone group of antibiotics as an empiric treatment.

M. Eshwarappa et al (4) have suggested using a 7- to 10-day oral fluoroquinolone regimen for outpatient management of mild to moderate UTI in the setting of a susceptible causative pathogen and rapid clinical response to therapy.

However, as stated by Akram et al (3) resistance is increasing to some of the commonly used agents, especially TMP-SMX, Quinolones, B-lactams.

From a public health perspective if we are using an antibiotic as a first line therapy for community acquired infections (UTI) its resistance level should be less than 20% [1,6]

As per our study resistance to commonly prescribed oral antibiotics is high (Quinolones 40%, B-lactams 34%,TMP-SMX 40%) Hence it is evident that these antibiotics have lost their relevance in the treatment of community acquired infections as they are found to be increasingly ESBL producing

This high incidence of resistance to Quinolones, Penicillins, and Sulfonamides could be attributed to high prescription of these agents for community acquired UTI It has been proved that resistance remains high even on stopping the prescription of these agents as bacteria do not pay a high fitness cost on the transmissibility of resistance (7, 13)

If one prescribes Quinolone it will enhance resistance to B lactams too as resistance to Quinolone is also associated with ESBL-production, by the production of CTX-M enzymes which are common among bacteria implicated in community-acquired UTI [8]

Similarly resistance to sulfonamides can be explained by the often close link of sulfonamide- resistant gene with other resistance determinants on mobile genetic elements (Plasmids) [7, 9].

AmpC, three integron- mediated resistance sets, Sul2 and other plasmid mediated genetic determinants are responsible for maintenance of resistance with low fitness cost (10, 11, and 12)

This shows that there is high risk of increasing cross resistance on prescription of Quinolones, B-lactams, and Sulfonamides

Hooton TM (1) suggested the use of Nitrofurantoin for the empiric treatment of uncomplicated UTI. This is supportable from a public health perspective in an attempt to decrease uropathogen resistance because it does not share cross-resistance with more commonly prescribed antimicrobials.

There is a high incidence of ESBL E. Coli even in the community acquired setting. 28% of these infections are asymptomatic. This in fact raises the real question that whether to treat these infections aggressively with carbapenems or not? Further studies are needed to answer this question

UTI in healthy adult men is uncommon but is generally caused by the same spectrum of uropathogens with the same antimicrobial susceptibility profile as that seen in women. The choice of antimicrobials is similar to that recommended for UTI in women. Treatment duration should generally be longer than that recommended for women. [1].

In our study the UTI was found twice more commonly in females than males and the spectrum of organism was similar

In summary, in our study,
1. Urinary tract infections are more common in females than males (2.1/1)
2. E. Coli is the most common pathogen. The incidence of E.coli ESBL is high (57%)
3. Antibiotic resistance is increasing with TMP-SMX, Quinolones, Nitrofurantoin, B-lactam antibiotics.
4. Aminoglycosides (17%) share least resistance with carbapenems (21%)
5. Presence of co-morbid conditions increases the risk of UTI (67 % Vs. 33 %) [p=0.013, Odds ratio >1]
6. Most (85%) of the urinary infections are associated with symptoms. However 15% were asymtomatic [p=0.001, Odds Ratio >1)
7. 24 patients (28%) with asymtomatic UTI have ESBL E. Coli on isolation which are only susceptible to carbapenems

Sensitivity patterns of community subject to so many factors beyond our control BUT "can we get an insight to at least best prescribing pattern?" is the real question

In our study we tried to get insight into this question
We found that,

From a public health perspective no oral antibiotic fulfilled the criterion of less than 20% resistance. Only injectable antibiotics [Aminoglycosides (17%) and carbapenems (21%)] fulfilled it.

In a complicated UTI scenario we may not have a choice than to use aminoglycosides and carbapenems

Antibiotic resistance results from a high prescription of antibiotics but also from antibiotic-resistant genes that are transmitted with other resistance determinants on mobile genetic elements

In a community acquired setting, however, it is advisable not to use quinolones, B-lactams, Sulfonamides as first line therapy as it will increase the cross resistance in community further

Nitrofurantoin, on the other hand, will not share the cross resistance owing to its unique mechanism of action and should be used as first line therapy even though its resistance is high

Hence, we recommend,
- Urine culture and treatment based on culture is mandatory to avoid or decrease further rise in resistance of these antibiotics
- There is high incidence of resistance to TMP-SMX, Quinolones, B-lactams even in community acquired setting. Hence it is advisable to avoid using these antibiotics as first line therapy
- Nitrofurantoin should be used awaiting culture, empirically from public heath perspective in uncomplicated UTI as it does not share cross resistance

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