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Original Research Paper

General Medicine

AN OBSERVATIONAL STUDY OF THE CLINICO-MICROBIOLOGICAL SENSITIVITY PATTERN IN A TERTIARY CARE TEACHING HOSPITAL OF THE RAMGANGA REGION OF U.P.(INDIA) DURING A PERIOD OF 16.9.2019-15.3.2020

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ABSTRACT

Background and rationale: **Worldwide a**ntibiotic resistance is a problem. Many complex factors are related to this. India is also seeing the rise in resistant strains of several bacteria on the antibiotic sensitivity pattern and prevalent microorganisms. This study also attempts to establish a way of presentation of the relevant findings which can be used in future to ensure easy comparability and contrasting of findings. **In any tertiary care teaching hospital a**ntimicrobials are a major class of drugs prescribed. Empirical use of antibiotics are needed many a times but it cause drug resistance which need study and need evaluation after the culture and sensitivity reports are available. This study was planned to assess the drug resistance and sensitivity patterns of the isolates from urine, bold, body fluids as well as pus of which 856 samples were studied within sixmonths' time and the sensitivity to antibiotics were studied.

Methods: An observational- prospective study was conducted in the Tertiary care teaching hospital over a period of six months to assess antibiotic sensitivity and resistance pattern. The specimens were collected from the adult patients (age >18 years) admitted in the Internal Medicine ward of Rohilkhand Medical College Hospital, Bareilly, over a period of 6 months. The sampling technique was consecutive sampling method. Specimens which were culture positive, were only included in the study for analysis. Multiple specimens were taken. A total of 856 consecutive patients were included in the study receiving antibiotics in the hospital as indoor patients having cultures with significant growth. Samples of urine, blood and body fluids were collected and culture growth was identified with antimicrobial sensitivity testing was done and resistance pattern was noted.

KEYWORDS : Antibiotics, sensitivity pattern,Resistance

METHODS:

An observational- prospective study was conducted in the Tertiary care teaching hospital over a period of six months to assess antibiotic sensitivity and resistancepattern. The specimens were collected from the adult patients (age >18 years) admitted in the Internal Medicine ward of Rohilkhand Medical College Hospital, Bareilly, over a period of 6 months. The sampling technique was consecutive sampling method. Specimens which were culture positive, were only included in the study for analysis. Multiple specimens were taken.

A total of 856 consecutive patients were included in the study receiving antibiotics in the hospital as indoor patients having cultures with significant growth. Samples of urine, blood and body fluids were collected and culture growth was identified with antimicrobial sensitivity testing was done and resistance pattern was noted.

RESULTS:

Overall **Only 28.73%(246 out of 856 sample) had *Staphyllococus aureus*, a Gram positive organism and hence, a Gram negative preponderance was seen where** *E. coli* was present in 37.5% of samples and *Pseudomonas* 15.5%, *Klebsila* 11.9% and *Acinobacter* 6.3%.of samples.

- *S. aureus* was sensitive to vancomycin (100 %), linesezolid(100 %), teicarrcillin (98%), amikacine (89%), levofloxacine (88 %),
- *E. coli*had sensitivity to imipramin (85 %), amikacin (80%), chloramphenicol (60%),pipracillin + tazobacter (58%),gentamicin (60%)
- *Pseudomonas*had sensitivity toimipramin (83%), Pip+Tazo(76%),Amika(71%),Pipera(71%) ,Cipro(68), Oflox(61%)
- *Klebsila*had sensitivity toimipramin (85%),Chlora(55%), pipracillin + tazobacter (65%), Amika (67%), Cefo+Sul (63%), levofloxacine (58%)
- *Acinobacte*r had sensitivity topipracillin + tazobacter (42%), imipramin(50%),cefop+sul(55%),ofloxacine (50%), levofloxacine (66%), amikacine (48%)
- **In uinary samples***E.coli* had sensitivity to norfloxacine 7% and nitofurantoin 36%
- *Staph aureus* had sensitivity to norfloxacine nitofurantoin 3% and 16%, *Pseudomonas* had sensitivity to norfloxacine 3% and nitofurantoin 0.7%, *Klebsila* had sensitivity to norfloxacine 3% and nitofurantoin 2%
- *Acinobacter*had sensitivity to norfloxacine 4% and nitofurantoin 0%

	Pathogens	(%)	Trend of sensitivity pattern (% sensitivity)	Norflox	Nitrofur
1	**E .coli Tobra (54%)**	**Present (37.5 %)**	Imip(85 %),Amika(80%),Chlora (60%),Pip+Tazo(58%), Genta (60%)	**7%**	**36%**
		Past (37 %)	Imip(91%)Amika(79%), Chlora(68%),Genta(55 %)Tobra(61%) ,	**10%**	**88%**
2	**Staphylococcus aureus** Clinda (55 %) Tetra (74%),Doxy (61)	**Present (28.7 %)**	Vanco(100 %),Linez(100 %),Teico(98%),Amika(8 9%),Levo(88 %),	**3%**	**16%**

		Past (27 %)	Vanco(100 %),Linez(100 %),Teico(91 %),Tetra (88%),Doxy(87 %),	**17%**	**65%**
3	**Pseudomonas** Tobra (52 %) Genta (63 %)	**Present (15.5 %)**	Imipen(83%),Pip+Tazo (76%),Amika(71%),Pip era(71%) ,**Cipro(**68), Oflox(61%)	**3%**	**0 .7 %**
		Past (19 %)	Imipen(85%),Amika(75 %),Pip+Tazo(71%), Genta(68%),Tobra (67%)	**0%**	**0%**
4	**Klebsiella** Tobra (44 %)	**Present (11.9%)**	Imipen(85%),Chlora(5 5%),Pip.+Tazo(65%),A mika(67%),Cefo+Sul(6 3%),Levo(58%)	**3%**	**2%**
		Past (10 %)	Imipen(86%),Pip.+Taz o(71%),Amika(67%),Ce fo+Sul (60%),Tobra (59%)	**38%**	**31%**
5	**Acinetobacter** Mero(57%) Tobra(32 %)	**Present (6.3 %)**	Pip+Tazo(42%),Imipen (50%),Cefop+sul(55%) ,Oflox(50%),Levo(66%),Amika(48%)	**4%**	**0%**
		Past (7 %)	Imip(77%),Merop(66%),Tobra (58 %),Pip+Tazo(54%), Cefop+sul(48%)	**0%**	**0%**
Total Sample.-856					
Clinical Sample	**321 E .coli 317**	**246 Sathaph 210**	**133 pseudom 155**	**102 Klebsiella 182**	**54 Acinetobacter 56**
	Pre. Past.	**Pre. Past.**	**Pre. Past.**	**Pre. Past.**	**Pre. Past.**
Body fl+Resp+ Pus	**166 158**	**173 147**	**103 115**	**76 60**	**43 48**
Urine	**145 156**	**48 44**	**19 23**	**23 19**	**4 4**
Blood	**10 3**	**25 19**	**11 17**	**3 3**	**7 4**
MRSA / ESBL PRODUCER	**ESBL 135**	**MRSA 116**		**ESBL 35**	
	42%	**47%**		**34%**	

DISCUSSION-

- From the sensitivity patternit is obvious that the vancomycin and lineszolid had the best sensitivity for the Gram Positive Staphylococcus but should be kept reserved as drugs to be used after failingof any of the levofloxacine, amikacine and teicarrcillin
- For Gram negatives for E.coli, , imiprmine is the most sensitive but should be used after the failure amikacin chloramphenicol pipracillin + tazobacter , gentamicin
- *Pseudomonas* had sensitivity to imipramin (83%), Pip+Tazo(76%),Amika(71%),Pipera(71%) ,Cipro(68), Oflox(61%)
- *Klebsila* had sensitivity to imipramin (85%),Chlora(55%), pipracillin + tazobacter (65%), Amika(67%), Cefo+Sul(63%), levofloxacine (58%)
- *Acinobacte*r had sensitivity to pipracillin + tazobacter (42%), imipramin(50%), cefop+sul (55%), ofloxacine (50%), levofloxacine (66%), amikacine (48%)

For urinary samples sensitivity is relatively low (with *E.coli* had sensitivity to norfloxacine 7% and nitofurantoin 36%.

- *Staph aureus* had sensitivity to norfloxacine nitofurantoin 3% and 16%, *Pseudomonas* had sensitivity to norfloxacine 3% and nitofurantoin 0.7%, *Klebsila* had sensitivity to norfloxacine 3% and nitofurantoin 2%
- *Acinobacter* had sensitivity to norfloxacine 4% and nitofurantoin 0%
- It will suggest clinician to choose according to the severity of the signs and symptoms to continue or change the antibiotics or uinary disinfectants in different clinical settings.

CONCLUSIONS:

Probably our sensitivity pattern is different than of the western world and we may use selected antibiotics for full course to avoid resistance.

A preponderance of gram negative bacteria over gram positive bacteria was noted with a higher degree of resistance to most of the first line antimicrobial agents. For urine samples.

Despite the widespread availability of antibiotics, UTI remains the most common bacterial infection in the human population.1 Antibiotics are usually given empirically before the laboratory results of urine culture are available. To ensure appropriate therapy, current knowledge of the organisms that cause UTI and their antibiotic susceptibility is mandatory.2

The development of antimicrobial resistance is a natural

process, which cannot be stopped. Resistance means that people cannot be effectively treated and they remain ill for longer period of time. It also means that epidemics are prolonged and thus that there is a greater risk of infection to others. The development of resistance is accelerated when antimicrobials are misused (http://www.emro.who.net). Despite the use of potent antibiotics still high mortality exists in case of *P. aeruginosa* infections. Nosocomial multidrug resistant *P. aeruginosa* is an important health care problem worldwide[3] Antimicrobial resistance prolongs the duration of hospitalization, thereby, increasing the cost of patient care. There are multiple factors, which contribute to the global spread of resistance. Decreasing unnecessary antibiotic use, treating with narrow spectrum agents, improving compliance with therapy, decreasing use of antibiotic in animal and agriculture, and improving infection control all have a role in confronting this problem. In addition, immunization may diminish the impact of resistance by preventing infection and also the carriage of transmission.

The indiscriminate use of broad-spectrum antibiotics is much emphasized in various studies 4,6

Carbapenems and teicoplanin and as found least usedand piperacillin-tazobactum was the most commonly used parentral antimicrobial followed by amoxicillin-clavulanic acid which may be suggested as per our sensitivity pattern also[7]

The role of fluoroquinolones is well established in CAP and all western guidelines where the baseline prevalence of TB is low endorse them. However, in India where there is a high burden of TB and where TB may present as CAP, use of empiric fluoroquinolone therapy may lead to masking and delayed diagnosis of TB and promotion of drug resistance. Therefore, fluoroquinolines are best avoided. Similarly, drugs with anti-tubercular activity including linezolid and aminoglycosides should not be used as per ICMR guidelines.[8].

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