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SENSITIVITIES OF *CITROBACTER*, *PROTEUS* AND *PROVIDENCIA* ISOLATES TO SULBACTAM-AMPICILLIN,TRIMETHOPRIM-SULFAMETHOXAZOL AND TICARCILLIN-CLAVULANIC ACID ANTIBIOTICS

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ABSTRACT

Gram negative bacterias which belong to Enterobacteriaceae family which is critically important as a matter of human health, are comperatively prevalent in nature and foods. Infections formed by bacterias resistant to antibiotics significantly cause mortality and economical losses. Sensitivities of gram-negative bacterias isolated from miscellaneous samples to sulbactam-ampicillin, trimethoprim-sulfamethoxazol and ticarcillin-clavulanic acid were analysed. In this study, *Proteus* is primary isolated microorganism with % 52,08. It was determined that *Proteus* types are proportionally 86,66% sensitive to Trimethoprim-Sulfamethoxazol and 76% resistant to Sulbactam-Ampicillin . *Citrobacter* is the secondary isolated microorganism (31,25%). It was determined that *Citrobacter* types were 86,66% sensitive to Trimethoprim-Sulfamethoxazol and % 73,3 resistant to Sulbactam-Ampicillin. *Providencia* types which are thirdly isolated microorganism (16%), For *Providencia* types, Trimethoprim-Sulfamethoxazol were determined as the most effective antibiotic again with 86,66% sensitivity. Resistance to Sulbactam-Ampicillin was however, found to be 76%. In conclusion, it is very important to conduct sensitivity tests in choosing antibiotics for chemotherapy of infections. Trimethoprim-Sulfamethoxazol is recommended in the empiric treatment of urinary tract infections in our environment.

Key Words: Enterobacter, sensitive, SXT, TİM, SAM

INTRODUCTION

Gram negative bacteria belonging to *Enterobacteriaceae* family, which is critically important as a matter of human health, are prevalent in nature and foods. They especially exist in water and materials contaminated by excrement (1). Consequently, they are important sources of infection for humans when they consume contaminated foods. Infections caused by bacteria resistant to antibiotics significantly cause mortality and economical losses. Trimethoprim-sulfamethoxazol antibiotics and beta lactam inhibitors are frequently used in the treatment of Citrobacter, Proteus and Providencia, which belong to the family *Enterobacteriaceae*. For this reason, sensitivities of gram-negative bacteria isolated from miscellaneous samples to sulbactam-ampicillin, trimethoprim- sulfamethoxazol and ticarcillin-clavulanic acid were analyzed.

MATERIALS AND METHODS

In research, microorganisms isolated from 200 raw milk samples were identified as API 20 E kit (bioMeriux).In study,antibiotic sensitivities of isolated microorganisms,in accordance with NCCLS criterias, had been tested by the method of Kirby-Bauer disc diffusion in culture of Müeller-Hinton Agar (1).

In study, as a result of terming done with API 20 E kit from 200 samples, overall 48 (% 24) gram-negative isolate were obtained. It was determined that 15 (% 31,25) of these 48 isolates is *Citrobacter*, 25 (%52,08) of 48 is *Proteus* and 8 (%16,67) of 48 is *Providencia* type (Table 1).

Table 1: Distribution of isolated gram-bacteria

Type	Family	number of isolate
Citrobacter	*Citrobacter amaloniticus*	**2**
	Citrobacter braaki	**1**
	Citrobacter diversus	**1**
	Citrobacter freundi	**11**
Protes	*Proteus mirabilis*	**13**
	Proteus penneri	**6**
	Proteus vulgaris	**6**
Providencia	*Providencia rettgeri*	**6**
	Providencia stuarti	**1**
	Providencia alcalifaciens	**1**

RESULTS

In study, 2 (4,17%) *C.amaloniticus*, 1 (2,08%) *C.diversus*, 1 (2,08%) *C.braaki*, 11 (22,92%) *C. freundii* isolates belonged to *Citrobacter* type.Thirteen (%27,08) *P. mirabilis*, 6 (%12,5%) *P.penneri* 6 (%12,5) *P.vulgaris* isolates belonged to *Proteus* type. Six (12,5%) *P. rettgeri*, 1 (2,08%) *P. stuarti*, 1 (2,08%) *P.alcalifaciens* isolates belonged to *Providencia* type. Antibiotic sensitivities of isolated bacterias are shown in table 2, table 3 and table 4. Sulbactam-Ampicillin was found to be more effective than Trimethoprim-Sulfamethoxazol and Ticarcillin-Clavulanic acid in the treatment of urinary tract infections.

Table 2: Sensitivity proportions of isolated *Citrobacter* bacterias to tested antibiotics

Antibiotic	Sensitive (number of isolate)	medial sensitive (number of isolate)	resistant (number of isolate)
SAM	**2 (%13,3)**	**2 (%13,3)**	**11 (%73,3)**
SXT	**13 (%86,66)**	**0 (%0,0)**	**2 (%13,33)**
TİM	**3 (%20)**	**2 (%3,66)**	**10 (%66,6)**

SAM:Sulbactam-Ampicillin;SXT:Trimethoprim-Sulfamethoxazol;TİM:Ticarcillin-Clavulanic acid

Table 3: Sensitivity proportions of isolated *Proteus* bacterias to tested antibiotics

Antibiotic	Sensitive (number of isolate)	medial sensitive (number of isolate)	Resistant (number of isolate)
SAM	2 (%8)	4 (%16)	19 (%76)
SXT	24 (%96)	0 (%0,0)	1 (%4)
TİM	6 (%24)	6 (%24)	13 (%52)

SAM:Sulbactam-Ampicillin;SXT:Trimethoprim-Sulfamethoxazol;TİM:Ticarcillin-Clavulanic acid

Table 4: Sensitivity proportions of isolated *Providencia* to tested antibiotics

Antibiotic	Sensitive (number of isolate)	medial sensitive (number of isolate)	Resistant (number of isolate)
SAM	2 (%25)	1 (%12,5)	5 (%62,5)
SXT	2 (%25)	2 (%25)	4 (%50)
TİM	1 (%12,5)	3 (%37,5)	4 (%50)

SAM:Sulbactam-Ampicillin;SXT:Trimethoprim-Sulfamethoxazol;TİM:Ticarcillin-Clavulanic acid

DISCUSSION

In treating bacterial infections, determining antimicrobial sensitivity is very important for success. Urinary tract infections caused by *Proteus* bacterias were declared as chronic

in nature and difficult to treat (2). In this study, *Proteus* was the most frequently isolated microorganism (52,08% of isolates). It was determined that *Proteus* types were highly sensitive to Trimethoprim-Sulfamethoxazol -SXT

(86,66 %) and resistant to Sulbactam/Ampicillin –SAM (76%). *Citrobacter* types mostly couse urinary tract infections (3). In study, *Citrobacter* was the second most frequently isolated microorganism (31,25% of isolates). It was determined that *Citrobacter* types were 86,66% sensitive to Trimethoprim-Sulfamethoxazol SXT and % 73,3 resistant to Salbactam SAM antibiotic. On the other hand, *Providencia* types which were the thirdly isolated microorganism (16,66% frequency) are known to cause lower and upper urinary tract infections and kidney stone formation. Within the *Providencia* types, SXT were determined as the most effective antibiotic again with 86,66% sensitivity. Resistant of Sulbactam antibiotic however,were determined as 76%. In different studies done in our country, it was determined that Sulbactam resistance amongst gram-negative bacterias is between 80 and 100% and Trimethoprim-Sulfamethoxazol SXT resistance is

between 38 and 100 (4,5). As per the results of our research, sensitivity of acterias to Trimethoprim-Sulfamethoxazol SXT antibiotic were found to be significanly higher than those of Sulbactam SAM and Ticarcillin-Clavulanic acid. In conclusion, it is very important to conduct sensitivity tests in choosing antibiotics for chemotherapy of infections. Trimethoprim-Sulfamethoxazol is recommended in the empiric treatment of urinary tractm infections in our environment.

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