

Acinetobacter Infection and Resistance Profile of Intensive Care Units in a City of Northwestern Anatolia

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Abstract

Introduction: Determination of suitable antibiotics in treatment of Acinetobacter infections is through the hospital ascertaining the resistance state to bacteria causing the problem. In this study, the evaluation of antibiotics sensitivity of Acinetobacter strains isolated as infection factor in patients hospitalized in intensive care units is aimed.

Methods: Acinetobacter strains isolated from the samples of patients hospitalized in the 2nd and 3rd Stage adult intensive care units of a province in northwestern Anatolia have been studied.

Results: A total of 165 patients were included in the study. The most isolated samples were respiratory tract samples, blood and urine. The antibiotics which the factors were most sensitive were colistin (66,1%) gentamicin (22,4%) and trimethoprim sulfamethoxazole (18,2%).

Conclusion: We face increasing resistance ratios in Acinetobacter strains. Necessary precautions should be taken for this.

Keywords: Acinetobacter, Colistin, Intensive care unit.

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Introduction

Acinetobacter is a gram-negative, coccobacillus, immobile, non-fermentative, opportunistic pathogen microorganism (1). This pathogen can be commonly seen in intensive care units due to capability of staying alive in dry surfaces and colonizing in respiratory devices and human skin (2,3). It may cause meningitis, pneumonia, bacteremia and urinary system infection (3). Due to easily developing resistance to antimicrobial agents by various mechanisms, difficulties are experienced in its control and treatment (4,5). Antibiotic resistance may vary from hospital to hospital and determination of suitable antibiotic is very important in treatment of Acinetobacter infections (1,6).

In this study, we aimed to evaluate the antibiotic sensitivity of Acinetobacter strains isolated as infection factor in intensive care units.

Material and Methods

In this study, the Acinetobacter strains isolated from the blood, urine, tracheal aspirate, wound site,

catheter and other samples as infection factors from the patients hospitalized in Adult Intensive Care Units of 2nd and 3rd stage hospitals in a province of Northwestern Anatolia between 2014 and 2015 were studied. The samples were planted in 5% defibrinated sheep blood agar and Eosin Methylene-Blue mediums and incubated at 37°C. Sterile body samples were incubated for a maximum of 10 days at 37°C in bottles belonging to Bactec 9120 (Becton Dickinson, USA) blood culture system. After the bacteria is isolated, it is first evaluated by conventional methods. It is taken to panels belonging to BD Phoenix 100 (Becton Dickinson, USA) automated identification device for certain identification and determination of antimicrobial sensitivities. Amikacin, ampicillin-sulbactam, gentamicin, imipenem, meropenem, ertapenem, colistin, piperacillin-tazobactam, ceftriaxone, ciprofloxacin, tigecycline, trimethoprim-sulfamethoxazole and aztreonam sensitivities were studied. A strain from each patient were studied, moderately sensitive strains were considered resistant. The results were interpreted according to CLSI standards.



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Results

A total of 165 patients were included in the study and recurrent reproductions in each patient were not included in the study. Of the patients, 76 were female, 89 were male and age average was 73 ± 17 . Most commonly isolated samples were respiratory tract samples, blood and urine (Table 1). Most sensitive antibiotics were colistin (66,1%) gentamicin (22,4%) and trimethoprim sulfamethoxazole (18,2%) (Table 2).

Table 1. Acinetobacter isolated spaces

	n	%
Respiratory tract	102	35,2
Urine	12	7,3
Catheter	8	4,8
Blood	30	18,2
Wound	9	5,5
Pleural effusion	3	1,8
Cerebrospinal Fluid	1	0,6
Total	165	100,0

Table 2. Antibiotic sensitivity of isolated strains

Antibiotic	Sensitive	Resistance
Colistin	109 (66,1)	56 (33,9)
Amicasin	15 (9,1)	150 (90,9)
Gentamicin	37 (22,4)	128 (77,6)
Trimethoprim / Sulfamethoxazole	30 (18,2)	135 (81,8)
Tigecycline	11 (6,7)	154 (93,3)
Ertapenem	1 (0,6)	164 (99,4)
Imipenem	11 (6,7)	154 (93,3)
Meropenem	3 (1,8)	162 (98,2)
Seftriakson	1 (0,6)	164 (99,4)
Aztreonam	1 (0,6)	164 (99,4)
Ampicillin-Sulbactam	9 (5,5)	156 (94,5)
Ciprofloxacin	2 (1,2)	163 (98,8)
Levofloxacin	3 (1,8)	162 (98,2)
Tetracycline	15(9,1)	150 (90,9)
Piperacillin-Tazobactam	2 (1,2)	163(98,8)

Discussion

The importance of Acinetobacter infections is increasing. Multiple antibiotic use with the increase in the number of intensive care units and patients

is thought to be one of the considerable underlying causes of antibiotic resistance of microorganisms. This study showed that resistance for Acinetobacter infections is increasing in intensive care units. Difficulties in treatments related to multiple resistance are encountered.

Acinetobacter infections cause multiple drug resistance infections in parallel to increase risk factors such as duration of length of stay in intensive care unit, frequent use of antimicrobial agents, immunosuppressing, invasive procedures (7,8).

Acinetobacter infections are isolated from various samples. Acinetobacter infections are most commonly isolated from tracheal aspirates, wound site, blood and urine samples (9). Aral et al. (1) reported tracheal aspirate 30%, wound site 29% and blood 25%. Kurtoğlu et al. (10) have determined tracheal aspirate 42%, wound site 28%, urine 12% and blood 10%. Similarly, in our study, the bacteria was most commonly isolated in respiratory tract samples, blood and urine samples.

The resistance rates to carbapenems, quinolones and aminoglycosides in Acinetobacter strains increased to very high rates. At the same time, an increasing resistance against colistin, which is used effectively in resistant strains, can be developed. Different Carbapenem resistance results for Acinetobacter have been reported in our country. A multi-centered HITI-1 study conducted in 2008, imipenem resistance in hospital-origin Acinetobacter strains was reported as 52,2% (11). This rate was reported as 61% by Mansur et al. (12). In the intensive care units, Kuşçu et al. (13) have reported this ratio as 80%. In a multi-center study conducted in Korea, it was reported that imipenem resistance in *A. baumannii* increased from 52.9% to 89.8% (14). The imipenem resistance ratio in the intensive care unit of our hospital was 93,3%. Ciprofloxacin, meanwhile, was found 84% in the study of Mansur et al. (12), 82% in Balci et al. (15) and 89% in Özer et al. (16). This ratio was found as 98,8% in our own intensive care units. This finding is one of the highest ratios in our country. Additionally, there are different results of the studies in which the aminoglycoside resistance was investigated. The resistance rates for amikacin may vary between 71,6% and 94%, and for gentamicin 66-97% (12,16,17). Gentamicin resistance (77,6%) was found lower than amikacin (90,9%) in our study. We believe this may be related to frequent preference of amikacin instead of gentamicin in treatment of nosocomial infections in our center.

For *Acinetobacter* strains with multiple drug resistances, colistin is considered as a suitable antibiotic. Colistin resistance was reported to be less than 10% in our country (1). In studies conducted in different countries it was reported as 5.3%, 3.6% and 0.7% (18,19). According to UHESA data, this resistance ratio is generally 2,95% in our country. This still makes us think colistin a suitable treatment in *Acinetobacter* infection with multiple drug resistance treatment. However, we found a

relatively high colistin resistance in our intensive care units (33,9%).

In conclusion; we have demonstrated that a relatively high rate of resistance of antibiotics to clinically important *Acinetobacter* strains. Additionally, we also recommend that the intensive care unit personnel must be informed about bacteria infection control practices because of the tendency of these pathogens to persist and spread in the hospital environment easily.

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