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# Evaluation of Antibiotic Resistance and Extended-Spectrum β-Lactamases Production Rates of Gram Negative Rods in a University Research and Practice Hospital, 2012-2015

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**Abstract :** Objective: Gram-negative rods are a large group of bacteria, and include many families, genera, and species. Most clinical isolates belong to the family Enterobacteriaceae. Resistance due to the production of extended-spectrum β-lactamases (ESBLs) is a difficulty in the handling of Enterobacteriaceae infections, but other mechanisms of resistance are also emerging, leading to multidrug resistance and threatening to create panresistant species. We aimed in this study to evaluate resistance rates of Gram-negative rods bacteria isolated from clinical specimens in Microbiology Laboratory, Afyon Kocatepe University, ANS Research and Practice Hospital, between October 2012 and September 2015. Methods: The Gram-negative rods strains were identified by conventional methods and VITEK 2 automated identification system (bio-Mérieux, Marcy l'etoile, France). Antibiotic resistance tests were performed by both the Kirby-Bauer disk-diffusion and automated Antimicrobial Susceptibility Testing (AST, bio-Mérieux, Marcy l'etoile, France) methods. Disk diffusion results were evaluated according to the standards of Clinical and Laboratory Standards Institute (CLSI). Results: Of the totally isolated 1.701 Enterobacteriaceae strains 1434 (84,3%) were Klebsiella pneumoniae, 171 (10%) were Enterobacter spp., 96 (5.6%) were Proteus spp., and 639 Nonfermenting gram negatives, 477 (74.6%) were identified as Pseudomonas aeruginosa, 135 (21.1%) were Acinetobacter baumannii and 27 (4.3%) were Stenotrophomonas maltophilia. The ESBL positivity rate of the totally studied Enterobacteriaceae group were 30.4%. Antibiotic resistance rates for Klebsiella pneumoniae were as follows: amikacin 30.4%, gentamicin 40.1%, ampicillin-sulbactam 64.5%, cefepime 56.7%, cefoxitin 35.3%, ceftazidime 66.8%, ciprofloxacin 65.2%, ertapenem 22.8%, imipenem 20.5%, meropenem 20.5 %, and trimethoprim-sulfamethoxazole 50.1%, and for 114 Enterobacter spp were detected as; amikacin 26.3%, gentamicin 31.5%, cefepime 26.3%, ceftazidime 61.4%, ciprofloxacin 8.7%, ertapenem 8.7%, imipenem 12.2%, meropenem 12.2%, and trimethoprim-sulfamethoxazole 19.2 %. Resistance rates for Proteus spp. were: 24,3% meropenem, 26.2% imipenem, 20.2% amikacin 10.5% cefepim, 33.3% ciprofloxacin and levofloxacine, 31.6% ceftazidime, 20% ceftriaxone, 15.2% gentamicin, 26.6% amoxicillin-clavulanate, and 26.2% trimethoprim-sulfamethoxale. Resistance rates of P. aeruginosa was found as follows: Amikacin 32%, gentamicin 42 %, imipenem 43%, merpenem 43%, ciprofloxacin 50%, levofloxacin 52%, cefepim 38%, ceftazidim 63%, piperacillin/tacobactam 85%, for Acinetobacter baumannii; Amikacin 53.3%, gentamicin 56.6 %, imipenem 83%, merpenem 86%, ciprofloxacin 100%, ceftazidim 100%, piperacillin/tacobactam 85 %, colisitn 0 %, and for S. malthophilia; levofloxacin 66.6 % and trimethoprim/sulfamethoxozole 0 %. Conclusions: This study showed that resistance in Gram-negative rods was a serious clinical problem in our hospital and suggested the need to perform typification of the isolated bacteria with susceptibility testing regularly in the routine laboratory procedures. This application guided to empirical antibiotic treatment choices truly, as a consequence of the reality that each hospital shows different resistance profiles.

**Keywords :** antibiotic resistance, gram negative rods, ESBL, VITEK 2
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