medical sciences forum

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Abstract

Resistance Rates to Third-Generation Cephalosporins and Carbapenems in *Serratia marcescens* Isolates Obtained from Various Clinical Samples from Two Bulgarian Hospitals †

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† Presented at the 2nd International Electronic Conference on Antibiotics—Drugs for Superbugs: Antibiotic Discovery, Modes of Action and Mechanisms of Resistance, 15–30 June 2022; Available online: https://eca2022.sciforum.net/.

Keywords: Antibiotic resistance; Resistance rates; third-generation cephalosporins; Carbapenems; ESBL; *Serratia marcescens*

Citation: Radeva, S.; Bojkova, M.; Niyazi, D.; Savova, D.; Stoeva, T. Resistance Rates to Third-Generation Cephalosporins and Carbapenems in *Serratia marcescens* Isolates Obtained from Various Clinical Samples from Two Bulgarian Hospitals. *Med. Sci. Forum* **2022**, *12*, 32. https://doi.org/10.3390/eca2022-12693

Academic Editor: Manuel Simões

Published: 15 June 2022

1. Aim

Serratia marcescens is a bacterial species associated with different types of infections, including hospital-acquired infections. The aim of this study was to examine the resistance rates to third-generation cephalosporins and carbapenems in *S. marcescens* isolates obtained from various clinical samples of patients hospitalized in two Bulgarian University hospitals.

2. Materials and Methods

A total of 180 non-duplicate clinically significant isolates of *S. marcescens*, collected in 2017–2021, were examined: blood, n = 19; urine, n = 64; respiratory tract secretions, n = 36; wounds, n = 44; others, n = 17. Species identification and antimicrobial susceptibility testing were completed by Phoenix (BD, Franklin Lakes, NJ, USA) and Vitek 2 (bioMerieux, Marcy-l'Étoile, France) automated systems. The Double Disc Synergy Test (DDST) was used as a screening test for the detection of ESBL (Extended Spectrum Beta-Lactamase) production.

3. Results

A total of 89 isolates (49.4%) were resistant to third-generation cephalosporins. Among these isolates, the DDST was positive in 32.2% (n = 58). Isolates resistant to third-generation cephalosporins were most commonly obtained from patients in Nephrology (n = 31), Urology (n = 12), and Intensive Care Unit (ICU) (n = 12). The highest rate of third-generation cephalosporin resistance was found among the urine isolates (25.6%, n = 46), followed by blood (7.2%, n = 13) and wound isolates (5%, n = 10). In the studied collection of 180 isolates, cefepime-resistant isolates comprised 47.8% (n = 86). Three isolates resistant to third-generation cephalosporins were susceptible to cefepime. Carbapenem resistance prevalence in the whole collection was 3.3% (n = 6).

4. Conclusions

The high rates of third-generation cephalosporin resistance and ESBL production among clinically significant isolates of *S. marcescens* and the detection of carbapenem-

resistant isolates are worrisome trends because they are associated with infections with very limited treatment alternatives and are usually found in immunocompromised patients.

Supplementary Materials: The following are available online at https://www.mdpi.com/article/10.3390/eca2022-12693/s1.

Author Contributions: Conceptualization, S.R. and T.S.; methodology, S.R.; validation, S.R. and D.S. and M.B.; formal analysis, D.N.; investigation, S.R.; resources, S.R.; data curation, S.R.; writing—original draft preparation, S.R.; writing—review and editing, S.R., M.B. and T.S.; visualization, S.R., supervision, T.S.; project administration, S.R.; funding acquisition, T.S. All authors have read and agreed to the published version of the manuscript.

Funding: This research is part of project No. 21010 of the Science Fund and is funded by Medical University of Varna.

Institutional Review Board Statement: The study was conducted in accordance with the Declaration of Helsinki, and approved by the Ethics Committee of Medical University of Varna (protocol code 115, from 31 March 2022).

Informed Consent Statement: Not applicable.

Data Availability Statement: Not applicable.

Conflicts of Interest: The authors declare no conflict of interest.