

**Title: Antimicrobial Susceptibility Profiling of *Serratia marcescens* isolates from an Intensive Care Unit**

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**Abstract:**

*Serratia marcescens* is an opportunistic pathogen, which is well established as a nosocomial pathogen, resulting in considerable morbidity and mortality in susceptible patients. The aim of this study was the investigation of *S. marcescens* in an ICU from 2011 to 2014. The samples were analyzed by the LACEN-TO. The strains (111) were isolated from tracheal aspirate (50; 45.05%), blood (18; 16.22%), rectal swabs (16; 14.41%), wound (7; 6.31%), lesion (2; 18.02%), abscess (1; 0.9%), urine (4; 3.6%), abdominal secretions (1; 0.9%), cerebrospinal fluid (2; 1.8%), sputum (1; 0.9%), drains (3; 2.7%), catheter tip (6; 5.4%). All isolates were identified by conventional biochemical testing and interpretative criteria established by the CLSI guidelines. Results were confirmed by VITEC-2 automated system. All strains were resistant to all  $\beta$ -lactams: ampicillin, ampicillin-sulbactam, piperacillin-tazobactam, cefuroxime, cefuroxime-axetil, ceftazidim, ceftazidim, ceftriaxon, cefepime, ertapenem, imipenem, meropenem. *S. marcescens* is an enterobacterial species expressing a chromosomally encoded and inducible class C  $\beta$ -lactamase, so it is naturally resistant to aminopenicillins and many cephalosporins. Clavulanic acid-inhibited extended spectrum-lactamase and metallo- $\beta$ -lactamases have been reported in these species. Thus, *S. marcescens* may become resistant to all  $\beta$ -lactams. Of these, 110 (99.1%) and 1 (0.9%) strains were resistant and sensitive to colistin, respectively. For tigeciclin 50 (45.04%), 52 (46.85%) and 9 (8.11%), ciprofloxacin 15 (13.51%), 1 (0.9%) and 95 (85.6%), gentamicin 25 (22.52%), 7 (6.31%) and 79 (71.2%), amikacin 12 (10.81%), 4 (3.6%) and 95 (85.6%) *S. marcescens* isolates were classified as resistant, less sensitive and susceptible, respectively. Ciprofloxacin is one of the most potent first generation fluoroquinolones active against a broad range of bacteria, the most susceptible ones are the *Enterobacteriaceae*. However, resistance to ciprofloxacin is widespread. Despite *S. marcescens* demonstrate reduced susceptibility to the antimicrobials most frequently used as first-line therapy, the newer aminoglycosides with broader spectra of antibacterial activity, such as gentamicin and amikacin suggests that the implementation of newer drugs could still be the gold standard for treatment in cases of more resistant bacteria. We found an emerging multidrug resistance among *S. marcescens*. This reflected the importance of continuous monitoring of nosocomial infections.

**Keywords:** *Serratia marcescens*, multidrug resistance, intensive care unit