

Epidemiology of bacterial infections and antibiotic resistance in BMT clinic: A single center experience

Vladimir N. Vavilov¹, Olga B. Ponomarenko¹, Marina O. Popova¹, Svetlana S. Emelyanova², Maria Yu. Averjanova¹, Oleg V. Goloschapov¹, Ludmila S. Zubarovskaya¹, Boris V. Afanasyev¹

¹Memorial R.M. Gorbacheva Institute of Children Hematology and Transplantation, St. Petersburg Pavlov State Medical University, St. Petersburg, Russia;

²Petersburg Nuclear Physics Institute, Russian Academy of Science, St. Petersburg, Russia

Correspondence: Vladimir N. Vavilov, Memorial R.M. Gorbacheva Institute of Children Hematology and Transplantation, St. Petersburg Pavlov State Medical University, 6/8, Tolstoy str., St. Petersburg, 199044, Russia; E-mail: vladimir_vavilov@mail.ru

Abstract

Background: High-dose chemotherapy, hematopoietic stem cell transplantation (HSCT) and "graft-versus-host" disease treatment are associated with greatly increasing the risk of the most frequent and most life-threatening infectious complications.

Aim: The aim of this single-center study was to evaluate the epidemiology and antibiotic resistance of bacterial infections in oncohematological and HSCT patients.

Patients and methods: Three hundred consecutive, positive cultures were sampled from 79 high-risk patients. Cultures were provided with BacT/Alert® and Vitek® technologies.

Results: The organisms that most commonly caused infectious complications were *S. epidermidis*, *E. faecalis*, *E. faecium*, *S. aureus*, *K. pneumoniae*, *Enterobacter spp.*, *Acinetobacter spp.*, and *P. aeruginosa*.

The agents that most commonly caused bacteremia were *S. epidermidis*, *K. pneumoniae*, *P. aeruginosa*, *E. coli*, and *E. faecalis*. Compared with causes of bacteremia in 2006–2007, the study of 2008–2009 shows the superior but decreasing role of Gram-positive cocci and increasing rates of bacteremia episodes caused by Gram-negative agents. Analysis of antibiotic resistance shows high efficacy of vancomycin and linezolid, cefoperazone/sulbactam and piperacillin, and moderate efficacy of carbapenems, quinolones, and aminoglycosides. In contrast, increasing resistance to some third generation cephalosporins (only ceftriaxone and ceftazidime) was observed.

We observed increasing rates of multiresistant strains of *K. pneumoniae*, *P. aeruginosa* and *Acinetobacter spp.* At the same time there is no increasing rates of Gram-positive cocci: only 12.5% of *S. aureus* were resistant to oxacillin (ORSA). Low rates of vancomycin resistant enterococci (VRE) infections were observed.

Conclusions: Our study shows the emerging role of Gram-negative bacteria with increasing rates of multiresistant strains. Analysis of antibiotic sensitivity shows that the principles of antimicrobial agents use in patients with hematological and oncological diseases treated in BMT clinics should be changed.

Keywords: stem cell transplantation, acute leukemia, infectious complications, antibiotic resistance