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CARTA AO EDITOR

Spread of Multidrug-resistant microorganisms: a global threat and critical healthcare problem

Disseminação de microrganismos multirresistentes: uma ameaça global e um problema de saúde crítico

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Dear editor,

The high occurrence of nosocomial multidrug-resistant microorganisms is considered a global health problem and although the presence and transmission of these microorganisms is most frequently documented in recent decades in acute care facilities, all healthcare settings are affected. This implies that the approaches in the prevention and control of these pathogens have to be adapted to the specific needs (own risk factors) of each institution.¹ In Brazil, regard its continental dimensions, with macro and micro-regional differences in relation to existing hospitals, and problems of assisted population and available resources, bacterial resistance in hospitals offering tertiary care leads a significant problem and a challenge of the patient treatment. The antibiotic therapy in these hospitals is commonly overused and often little judicious. In addition, the absence of microbiology laboratories favors the incorrect prescription, and the lack of a national reference laboratory is another barrier to better understanding of these microorganisms as well as the epidemiology of infections, resulting in poor scientific documentation.²

The hospital microbiota responsible for the etiology of health care-associated infections has been modulated through the years by the most prescribed antibiotics, and to a lesser extent, by advances in medical technology as the increasing use of indwelling devices and prostheses.¹ Approximately 40% of hospitalized patients receive antibiotics, however, in about 50% of the cases, the use of

antimicrobials is unnecessary.³ Empirical therapy, particularly in critical units, is used with a combination of several broad-spectrum antibiotics, allowing multidrug-resistant strains such as *Methicillin-resistant Staphylococcus aureus* (MRSA), Gram-negative non-fermentative bacteria and Enterobacteriaceae family particularly those producing metallo- β -lactamase and extended spectrum β -lactamase to emerge and spread quickly.

Besides the strength of selection pressure of antibiotics, amplified by inadequate empirical use of potent and broad-spectrum antibiotics, other factors are also important in the epidemiology of infections by these microorganisms, including: 1) critically ill patients in intensive care units, that are often exposed to invasive devices, and frequently acquire associated infections,^{1,4} 2) the current social mobility, with international air travel predominantly for tourism, and more recently associated with major events, with the FIFA World Cup 2014 and Olympic Games in Rio de Janeiro 2016; 3) poor implementing of infection prevention and control practices by the lack of human, both in qualitative and quantitative terms, and financial resources contribute for intra- and inter-hospital transmission of pathogens and finally 4) the existence of clones, with better adaptation in the hospital environment and faster spread capacity due to the "fitness" to adjust its metabolism to new genes of exogenous origin.^{5,6}

In each prescription of antibiotics there is an ecological and environmental consequence. Their use not only

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selects and maintains resistant microorganisms in the environment, but also increases their spread.^{1,6} Today, the better diagnosis, more information on the ecology and local epidemiology, access to information of the severity of the condition, risk factors for developing infections, knowledge of pharmacokinetics and pharmacodynamics of antibiotics, better the prognosis for the patient.

Antibiotics represent a precious reserve as a drug, therefore it is required your protection through programs and policy measures that limit their inappropriate use not only for humans, also for animals for human consumption and aquaculture, as well as to ensure compliance to those practices relating to the use of these medicines in hospitals, hand hygiene and other important infection control measures.⁵ Also, recently, increasing attention to environmental sources of selective pressure antibiotics, considering that the treatment of wastewater hospitals, municipalities, the pharmaceutical industry and agriculture have also been recognized as sources of environmental exposure to antibiotics and antibiotic resistance genes.⁷

Countries like Brazil, characterized by the allocation of limited financial resources for the health department, have in the infection prevention and control practices an economical necessity, because of the increased costs that nosocomial infection demand in addition to the reduction of rates morbidity and mortality. Despite this scenario of the current slump and restrictions of Brazilian market on the use of antibiotics, it takes more effort and commitment of hospital managers and governments on how to develop an appropriate and effective policy to reduce the empirical and inappropriate use of antibiotics, particularly in the context of the health system reform. In addition, more comprehensive strategies should involve other components that are considered essential as

educational campaigns directed to health professionals, monitoring of antibiotic consumption and resistance and infections rates.

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