



Revista Brasileira de Hematologia e Hemoterapia
Brazilian Journal of Hematology and Hemotherapy

www.rbhh.org



Original article

Prophylaxis with levofloxacin: impact on bacterial susceptibility and epidemiology in a hematopoietic stem cell transplant unit

Livia Amaral Alonso Lopes*, Izelândia Veroneze, Célia Inês Burgardt, Christiane Johnscher Niebel Stier

Universidade Federal do Paraná (UFPR), Curitiba, PR, Brazil

ARTICLE INFO

Article history:

Received 13 March 2013

Accepted 1 August 2013

Keywords:

Hematopoietic stem cell transplantation

Drug resistance, bacterial

Fluoroquinolone

Antibiotic prophylaxis

A B S T R A C T

Background: The emergence of resistance has been demonstrated in cancer treatment centers where prophylaxis with fluoroquinolone is used.

Objective: Considering the importance of epidemiological monitoring as a strategy in choosing protocols involving antibiotics, this study aimed to evaluate the emergence of quinolone resistance and changes in the local epidemiology in a hematopoietic stem cell transplant service.

Methods: For this study, 60 positive cultures before the prophylactic use of levofloxacin (period A: 2007-2008) and 118 cultures after starting the use of prophylactic levofloxacin (period B: 2010-2011) were evaluated.

Results: Resistance increased for all the different types of bacteria isolated (from 46.0% to 76.5%; p -value = 0.0002). Among Gram-negative bacteria, resistance increased from 21.4% to 60.7% (p -value = 0.0163) and among Gram-positive bacteria, it increased from 55.6% to 82.9% (p -value = 0.0025). The use of levofloxacin increased from 19.44 defined daily doses per 1,000 patient-days in period A to 166.64 in period B. The use of broad spectrum antibiotics remained unchanged. Considering bacteria associated with infection, 72 and 76 were isolated in periods A and B, respectively. There was a reduction in the rate of Gram-negative bacteria in cultures associated with infection (3.81 vs. 2.00 cultures/1,000 patient-days; p -value = 0.008).

Conclusion: The study of prophylaxis with levofloxacin demonstrated that there was a decrease in infections by Gram-negative bacteria; however, bacterial resistance increased, even though the use of broad-spectrum antibiotics remained unchanged. Constant monitoring of local epidemiology combined with research on clinical outcomes is needed to evaluate the effectiveness of prophylaxis.

© 2014 Associação Brasileira de Hematologia, Hemoterapia e Terapia Celular.

All rights reserved.

*Corresponding author at: Hospital de Clínicas da Universidade Federal do Paraná, Rua General Carneiro, 181, 80060-900 Curitiba, PR, Brazil.

E-mail address: livialopes24@hotmail.com (L.A.A. Lopes).

1516-8484/\$ - see front matter © 2014 Associação Brasileira de Hematologia, Hemoterapia e Terapia Celular. Published by Elsevier Editora Ltda. All rights reserved.

DOI: 10.5581/1516-8484.20140011

Introduction

Patients undergoing hematopoietic stem cell transplantation (HSCT) during the neutropenic period have a high risk of fever, with a reported occurrence greater than 80%.¹

In an attempt to decrease the risk of associated complications, it has been routine for several decades to use antimicrobials as clinical prophylaxis during the neutropenic phase of HSCT patients. Fluoroquinolones were introduced in the 1980s as a prophylactic agent, and since then, this has been the most commonly used antibiotic class prescribed in this setting.²

Some aspects of the benefits brought by prophylactic fluoroquinolone use are still questioned. Reductions in the time of febrile neutropenia and infections in neutropenic patients are well-documented;¹⁻³ however, the impact of prophylaxis on mortality is still discussed. Although some meta-analyses have shown a reduction of this indicator,^{4,5} individually, most studies did not detect significant decreases.^{1,3} Due to the few benefits in reducing mortality and also due to the threat of developing bacterial resistance, studies and guidelines advise the use of prophylaxis only in high-risk patients, defined by the severity and/or duration of neutropenia.^{1,6} Other studies even discourage its use, particularly in centers where there is high incidence of resistant bacteria.⁷⁻⁹

Considering that changes in local bacterial epidemiology can impact treatment effectiveness and patient safety, this study assessed whether there was emergence of quinolone resistance related to the increased use of levofloxacin in one HSCT service. Possible changes in the epidemiology of bacteria associated with healthcare-associated infection (HCAI) after the introduction of clinical prophylaxis with levofloxacin were also investigated.

Methods

The HSCT Service of the Hospital das Clínicas of the Universidade Federal do Paraná (HC/UFPR) adopted prophylaxis with levofloxacin for neutropenic patients in the middle of 2009. An oral dose of 500 mg is used once daily from the initial conditioning or the infusion of hematopoietic stem cells until granulocyte recovery or the development of fever and early empirical antimicrobial therapy.¹⁰

Patients admitted from January of 2007 to December of 2011 were studied. The period from January of 2007 to December of 2008 was the period preceding the use of prophylactic levofloxacin (period A), and the period from January of 2010 to December of 2011 was characterized by the prophylactic use of levofloxacin (period B). The period from January to December of 2009 was not evaluated to avoid the possibility of bias in the results, since the transition of the protocol occurred in the month of July. Regarding readmissions, if a patient was hospitalized during both of the studied periods, the characteristics of this patient and culture results were considered separately for each period.

The susceptibility of the etiologic agents isolated in cultures and the epidemiology of bacteria linked to HCAI were evaluated in both periods. The frequency of resistance to quinolones was evaluated by microbiological investigations;

with the preparation of bacterial susceptibility profiles for periods A and B. Cultures of clinical samples with positive results obtained from hospitalized patients were analyzed. The results considered for the sensitivity profile were: resistant, intermediate, and sensitive. For patients with two diagnostic cultures, different strains for the same etiologic agent were considered when the interval between collections was longer than one month or when there was a change in sensitivity/resistance to at least one antimicrobial agent tested independent of the interval between collections. The use of levofloxacin, cefepime, and meropenem was assessed by defined daily dose (DDD) per 1,000 patient-days.

The Kirby-Bauer method, performed by the diagnostic support unit of the bacteriology department of in HC/UFPR, was used to evaluate the susceptibility profile, in accordance with the recommendations of the National Committee for Clinical and Laboratory Standardization.

Monthly routine epidemiological surveillance records, provided by the hospital's infection control department, were used for HCAI data. The hospital infection rate, the relationship between confirmed clinical and laboratory HCAI, the frequency of etiologic agents, and the topography of infections were analyzed.

The concepts and classification of HCAI followed the criteria of the Centers for Disease Control and Prevention (CDC) and the Brazilian criteria for healthcare-associated infections from 2009. Sepsis by coagulase-negative staphylococci (CNS) was defined when the microorganism was identified in two consecutive blood cultures or when the patient was treated empirically with vancomycin due to the results of a culture.

Statistical analyses were used to evaluate the association between the frequency of resistance in the two periods studied, the frequency of etiologic agents, and the characteristics of the population. The statistical software R was used for analysis, applying Pearson's chi-squared test, Fisher's exact test, and the Poisson test. *p*-values < 0.05 were considered to be statistically significant. The analysis was performed by the UFPR statistics laboratory.

Results

Patients' characteristics

A total of 378 patients were analyzed during the study period; 145 were hospitalized in period A and 233 were hospitalized in period B. Table 1 describes the characteristics of patients admitted during both periods.

The average ages were 16.24 years and 22.13 (*p*-value = 0.007), the percentages of men were 62.1% and 54.9% (*p*-value = 0.170), and the numbers of HSCTs performed were 161 and 244, for periods A and B, respectively. The most prevalent diagnoses in both periods were leukemia, severe aplastic anemia, and Fanconi anemia. The two groups were evenly distributed with respect to gender, but the distributions regarding age and type of diagnosis (*p*-value = 0.030) were statistically different. Analyzing separately the frequency of leukemia, the commonest diagnosis in both groups, no significant difference was observed (*p*-value = 0.170).

Download English Version:

<https://daneshyari.com/en/article/3333106>

Download Persian Version:

<https://daneshyari.com/article/3333106>

[Daneshyari.com](https://daneshyari.com)