Quinolone Resistance in Escherichia coli Bloodstream Infections in Stem Cell Transplant and Hematologic Malignancy Populations

Christopher Hauck MD,1 Pearlie Chong MD,1 Melissa Miller PhD2, Katarzyna Jamieson MD,1 Matthew Foster MD,1 Thomas Shea MD,1 David van Duin MD, PhD1

1Division of Infectious Diseases, University of North Carolina, Chapel Hill; 2Department of Pathology and Laboratory Medicine, University of North Carolina School of Medicine; 3Division of Hematology/Oncology, University of North Carolina at Chapel Hill

Abstract

Background: Quinolone prophylaxis is commonly used in patients with severe neutropenia. Here, we describe trends in quinolone susceptibility over time at a tertiary care cancer center which employs quinolone prophylaxis.

Methods: Data on the first positive blood cultures for E. coli per patient from 2000-2013 at UNC hospital were obtained. Cases were defined as patients with hematologic malignancy (HM) and hematopoietic stem cell transplant (HSCT).

Results: Controls were patients with E. coli bloodstream infection (BSI) during the same time period without HM or HCT. Rates of quinolone non-susceptibility were compared between cases and controls. In controls, time to all-cause mortality in 30 days and 1 year after first positive culture was compared based on quinolone susceptibility using Kaplan-Meier curves.

Conclusions: Quinolone resistance rates have increased dramatically over the last decade in HM and HSCT. In addition, rates have increased in control patients over this time.

• The increased rates of quinolone resistance in both the study group and the general population raise concerns about the continued efficacy of their use as prophylaxis.

• Increased rates of resistance in controls suggests stopping quinolone prophylaxis may have limited benefit in reducing rates of resistance among HM and HSCT patients.

• There was a significant association between quinolone resistance and mortality at 360 days. No association was seen at 30 days.

• The association between quinolone susceptibility and long-term mortality is likely the result of confounding factors, i.e. sicker patients being more likely to be infected with resistant E. coli.

References


Table 1. Characteristics of HSCT and HM patients with blood stream isolates positive for E. coli

Conclusion

• Quinolone resistance rates have increased dramatically over the last decade in HM and HSCT. In addition, rates have increased in control patients over this time.

• The increased rates of fluoroquinolone resistance in both the study group and the general population raise concerns about the continued efficacy of their use as prophylaxis.

• Increased rates of resistance in controls suggests stopping quinolone prophylaxis may have limited benefit in reducing rates of resistance among HM and HSCT patients.

• There was a significant association between quinolone resistance and mortality at 360 days. No association was seen at 30 days.

• The association between quinolone susceptibility and long-term mortality is likely due to confounding factors, i.e. sicker patients being more likely to be infected with resistant E. coli.

• Future evaluation of the effect of fluoroquinolone prophylaxis on rates of antibiotic resistance in the HSCT and hematologic malignancy patients is warranted.