SciMedCentral

Journal of Urology and Research

Review Article

Quinolones: Are They Still Safe for Urinary Infection Therapy in Latin America?

Mirella Alves Cunha and Marise Reis Freitas*

Department of Infectious Diseases, Federal University of Rio Grande do Norte, Brazil

***Corresponding author**

Marise Reis Freitas, Department of Infectious Diseases, Federal University of Rio Grande do Norte, Conego Monte Street, 110, Natal, Rio Grande do Norte, Brazil, Tel: 55-32327948; Email: mariserf@gmail.com

Submitted: 21 August 2017

Accepted: 19 January 2018

Published: 22 January 2018

ISSN: 2379-951X

Keywords

- Urinary tract infections
- Antibacterial drug resistance
- Enterobacteriaceae
- Antibacterial agents

Abstract

Urinary tract infection is a common problem worldwide and susceptibility rates of bacteria to antibiotics are important in determining the treatment of choice and its duration. High resistance rates of uropathogens to quinolones in Latin America draws attention to the choice of these drugs on empirical treatments, especially in patients with pyelonephritis.

ABBREVIATIONS

UTI: Urinary Tract Infection

INTRODUCTION

Urinary tract infection (UTI) is a common disease seen in community and nosocomial environments. It is defined by a tissue invasion of any part of urinary tract and it is more common in women, especially because a shorter urethra [1,2]. Usually, UTIs are classified in two groups: lower UTI, corresponding to infection on the bladder; upper UTI, frequently used as a synonym of pyelonephritis. Besides, UTIs are classified as uncomplicated and complicated, considering associated conditions that increases the risk of therapy failure, like diabetes, pregnancy, previous history of pyelonephritis, immunosuppression, among others. Frequently, UTIs are caused by only one agent and *Escherichia coli* is the pathogen most isolated around the world [2,3]. *E. coli* corresponds to 75 – 95% of microbial spectrum of UTI, followed by other species of Enterobacteriaceae family, such as *Proteus mirabilis*, *Klebsiella pneumoniae*, and *Staphylococcus saprophyticus* [3], with some particularities in proportion of pathogens and resistance profile, according to geographical region.

DISCUSSION AND CONCLUSION

Quinolones, especially ciprofloxacin, are drugs used largely in the UTI therapy, and have been shown to be effective since the beginning of their use in 80´s [4,5]. However, in the last decade, many studies have pointed to increasing of uropathogens resistance to quinolones, especially *E. coli*. The emergence of resistance to fluoroquinolones was recognized soon after the introduction of these drugs. Studies published in the early 1990s already demonstrated an increasing of resistance in some Europe regions [6,7]. A recent systematic review and meta-analysis [8] of observational studies including 53 studies showed and reaffirmed two important concepts: resistance varies significantly by region and, in addition, there was a significant rise in resistance on community-acquired *E. coli* UTI. Besides, resistance was significantly larger in developing countries. In this study, the community setting resistance to ciprofloxacin was 27%, which can be considered an alarming data, since this drug is frequently used in the clinical practice around the world and it is an option to complicated UTI, including those with sepsis signs [3].

In Latin America, the resistance scenario is also worrisome. In 2000, an antimicrobial surveillance program involving specimens from six Latin American countries (Brazil, Argentina, Chile, Colombia, Venezuela and Mexico) and including 434 bacterial isolates called attention to a high percentage of fluoroquinolone-resistant *E. coli* isolates (22.5%) in almost all Latin America centers [9]. The same surveillance program group published in 2006 new data about this issue. A total of 611 samples were collected from patients with community-acquired urinary tract infections. The data also demonstrated a high percentage of resistance rates (21.6%) of *E. coli* against the studied quinolones [10]. More recent studies also point to this problem. Cunha MA et al., assessed the susceptibility to antimicrobials of uropathogens isolated from community-acquired urinary tract infections in a northeastern Brazilian capital, including data from 2007 to 2010. Considering only *E. coli* (the most isolated agent), the resistance was 24.4% [11]. Reis AC et al., conducting another study including 1641 specimens also observed a high resistance to ciprofloxacin (18.4%) with a higher frequency of ciprofloxacin resistant *E. coli* (22.4%), when compared to other species [12]. Comparing two periods, Kiffer et al., demonstrated a trend of an increased resistance to quinolones from 2000 to 2003 [13]. Another alarming data was published in a study including 11.943 samples that also compared the susceptibility to antibiotics during two periods. There was a significant difference between the two

Table 1: Pattern of Enterobacteriaceae quinolone resistance.

Author	Period of study	Country	N species	% Enterobacteriacae quinolone resistance
Kresken M et al.	1983-1990	Europe	20,000	< 1
Aubert G et al.	1986-1990	France	17,902	3 – in general practice 10 – in hospitals
Gales AC et al.	1988	Latin America	434	10.4 – 35.7 (hospital isolates)
Andrade SS et al.	2003	Latin America	611	10.3 - 21.6 (community isolates)
Cunha MA et al.	2007-2010	Brazil	1,082	24.4 – 30.2
Reis ACet al.	2010-2014	Brazil	1,641	18.4 (community isolates)
Kiffer CR et al.	2000-2003	Brazil	37,261	4.2-38.7 (community isolates)
Miranda EJet al.	2005-2006 2010-2011	Brazil	11,943	4.9-10.1 8.1-21.9

N = number

periods studied (2005-2006; 2010-2011), with *E. coli* resistance to ciprofloxacin increasing from 7.1% to 15.1% [14]. Table 1 shows data about resistance pattern in Enterobacteriaceae of original studies mentioned above.

All these data alert to the overuse of quinolones and the increase of resistance around the world and in the Latin America. Although these surveillance resistance data are overestimated because usually, only specimens from people with complicated UTI tend to be submitted to culture, these trends are uncomfortable. Beyond this point, recently the U.S. Food and Drug Administration did a safety announcement alerting to serious side effects associated with fluoroquinolone antibacterial drugs and recommend that these drugs should be reserved for those who do not have alternative treatment options. We believe quinolones as empirical therapy, especially for patients with pyelonephritis and sepsis, must be considered carefully. In this situation, others drugs, like third generation cephalosporins and aminoglycosides are safer. Quinolone could be considered as an alternative especially considering the possibility of oral administration. Finally, nitrofurantoin and fosfomycin could be the first choice for the treatment of cystitis.

REFERENCES

1. Mody L, Juthani-Mehta M. Urinary tract infections in older women: a clinical review. JAMA. 2014; 26: 844-854.
2. Wang A, Nizran P, Malone MA, Riley T. Urinary tract infections. Prim Care. 2013; 40: 687-706.
3. Gupta K, Hooton TM, Naber KG, Wullt B, Colgan R, Miller LG, et al. International clinical practice guidelines for the treatment of acute uncomplicated cystitis and pyelonephritis in women: A 2010 update by the Infectious Diseases Society of America and the European Society for Microbiology and Infectious Diseases. Clin Infect Dis. 2011; 52: e103-20.
4. Sanders WE Jr. Efficacy, safety, and potential economic benefits of oral ciprofloxacin in the treatment of infections. Rev Infect Dis. 1988; 10: 528-543.
5. Polubiec A, Jórasz I, Kłos K, Ozarek-Medyńska T, Pietrzak J, Starzyńska R, et al. Results of ciprofloxacin therapy in urinary and respiratory tract infections. Pol TygLek. 1990; 45: 85-89.
6. Kresken M, Hafner D, Mittermayer H, Verbist L, Bergogne-Bérézin E, Giamarellou H, et al. Prevalence of fluoroquinolone resistance in Europe. Infection. 1994; 22: S90-98.
7. Aubert G, Levy PP, Ros A, Meley R, Meley B, Bourge A, et al. Changes in the sensitivity of urinary pathogens to quinolones between 1987 and 1990 in France. Eur J ClinMicrobiol Infect Dis. 1992; 11: 475-477.
8. Fasugba O, Gardner A, Mitchell BG, Mnatzaganian G. Ciprofloxacin resistance in community- and hospital-acquired Escherichia coli urinary tract infections: a systematic review and meta-analysis of observational studies. BMC Infect Dis. 2015; 15: 545.
9. Gales AC, Jones RN, Gordon KA, Sader HS, Wilke WW, Beach ML, et al. Activity and spectrum of 22 antimicrobial agents tested against urinary tract infection pathogens in hospitalized patients in Latin America: report from the second year of the SENTRY antimicrobial surveillance program (1998). J AntimicrobChemother. 2000; 45: 295-303.
10. Andrade SS, Sader HS, Jones RN, Pereira AS, Pignatari AC, Gales AC. Increased resistance to first-line agents among bacterial pathogens isolated from urinary tract infections in Latin America: time for local guidelines? Mem Inst Oswaldo Cruz. 2006; 101: 741-748.
11. Cunha MA, Assunção GL, Medeiros IM, Freitas MR. Aantibiotic resistance patterns of urinary tract infections in a northeastern brazilian capital. RevInstMedTropSao Paulo. 2016; 58: 2.
12. Reis AC, Santos SR, Souza SC, Saldanha MG, Pitanga TN, Oliveira RR. Ciprofloxacin resistance pattern among bacteria isolated from patients with community-acquired urinary tract infection. Rev Inst Med Trop Sao Paulo. 2016; 58: 53.
13. Kiffer CR, Mendes C, Oplustil CP, Sampaio JL. Antibiotic Resistance and Trend of Urinary Pathogens in General Outpatients from a Major Urban City. Int Braz J Urol. 2007; 33: 42-48.
14. Miranda EJ, Oliveira GS, Roque FL, Santos SR, Olmos RD, Lotufo PA. Susceptibility to antibiotics in urinary tract infections in a secondary care setting from 2005-2006 and 2010-2011, in São Paulo, Brazil: data from 11,943 urine cultures. Rev Inst Med Trop Sao Paulo. 2014; 56: 313-324.

Cite this article

Cunha MA, Freitas MR (2018) Quinolones: Are They Still Safe for Urinary Infection Therapy in Latin America? J Urol Res 5(1): 1094.