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PREVALENCE OF LEVOFLOXACIN RESISTANCE IN GRAM NEGATIVE BACILLI ISOLATES FROM CLINICAL SPECIMENS



Amol Kulkarni¹ and S.R. Deshmukh²

INTRODUCTION

Fluoroquinolones are the most preferred class of antibacterial agents for serious Gram negative infections. They are frequently used as alone and/or in combination with other agents to treat the multidrug resistant bacterial infections. Levofloxacin is one of the most important agent of this class with remarkable feature of treating both gram positive and gram negative bacteria (1). However the growing problem of bacterial resistance to this class of antibiotic both in community and in hospital settings is limiting its use. This decrease in the susceptibility is mainly attributed to the mutations in the gyrA and parC genes encoding the target of Fluoroquinolones (2). A marked resistance for this important agent has been observed. The purpose of this study was to find the prevalence of resistance in Enterobacteriaceae family to clinically important agent of this class to rationalize its use as it is the most used member of this class in clinical conditions, mainly against Gram negative bacteria.

Materials and methods:

ABSTRACT

Fluoroquinolones are one of the important classes of antibacterial agents for clinically important Gram negative bacterial pathogens. Levofloxacin is an important member of this class with highest acceptability. However, like other members it is also under threat of resistance. We have tested 122 clinical specimens of diverse genera and found a high level of resistance to levofloxacin. This observation indicates the decreased utility of this important option.

KEYWORDS : Fluoroquinolones, Levofloxacin, Gram negative, resistance.

Short Profile

Amol Kulkarni is working as Research Scholar , Master of Science (Microbiology).

A total of 122 gram negative bacterial isolates were tested for the MIC of Levofloxacin. The cultures were mainly isolated from urine, blood, body fluids, pus and intravenous cannula over a period of 1 year. Their identification was done by using standard specific biochemical tests such as IMViC test for Enterobacteriaceae (3). Commercial preparation of levofloxacin was used for this study.

The strains tested were majority from Enterobacteriaceae i.e. Klebsiella (n=47) and Escherichia coli (n=38). Acinetobacter was found next to them (n=11). Citrobacter, Serratia, Enterobacter spp, Proteus and Pseudomonas are other genera contributed to the isolates. MIC of all the cultures were determined by using Microdilution method using cation adjusted Mueller Hinton broth. The clinical and laboratory standard institute's recommendations were followed for MIC method (4). MICs were performed in 96 well plates and plates were incubated at 37°C in BOD incubators for 18-20hrs. After the incubation period is over the MIC values were determined

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by visual observations.

RESULTS:

The MIC range for Levofloxacin was found to have between 0.03 µg/mL to 32 µg/mL. It was found that two genera *Citrobacter* and *Enterobacter cloacae* are still sensitive to this agent, although the total no is very less (n=4). An interesting observation about the *Klebsiella* genus was out of 47 strains tested 16 strains (34.04%) were susceptible to levofloxacin (MIC < 0.5 µg/mL) whereas out of 38 *Escherichia coli* strains only 1 strain was susceptible to Levofloxacin. The next major genus was *Acinetobacter* (n=11) where all the strains were found resistant. The genera with less no of clinical isolates such as *Proteus*, *Pseudomonas*, *Serratia* *Enterobacter aerogenes* showed a varying MIC values however they were all resistant.

Table 1. Levofloxacin resistance profile of Gram negative bacilli (n=122)

Genera	No of species	% of resistance
<i>Klebsiella</i> spp	47	76.59
<i>Escherichia coli</i>	38	97.36
<i>Acinetobacter</i> spp	11	100
<i>Enterobacter</i> spp	11	66.66
<i>Proteus</i> spp	05	100
<i>Pseudomonas</i> spp	05	100
<i>Citrobacter</i> spp	03	66.66
<i>Serratia</i> spp	02	100
Total	122	82.78

DISCUSSIONS:

L Drago et al were observed the decrease in the susceptibility to levofloxacin and ciprofloxacin for the urinary pathogens with higher MIC₅₀ values (5). On the other hand Daniel et al observed the high susceptibility to levofloxacin for Enterobacteriaceae, *Acinetobacter* and *Pseudomonas* in their surveillance study (7).

In our present study we found 82.78% of the total tested isolates were resistant to Levofloxacin. The high spectrum of resistance was found in *Escherichia coli* (97.36%) and *Klebsiella* spp. (76.59%). Although Levofloxacin is known as antipseudomonal quinolone, the 100% resistance was found for *Pseudomonas* spp. A

varying degree of susceptibility was observed for genera like *Citrobacter*, *Enterobacter* and *Serratia*. These genera showed non susceptible category of strains (MIC 1-8 µg/mL).

CONCLUSION:

The present study indicates the high degree of Levofloxacin resistance among Gram negative clinical isolates which indicates the limited usefulness of this antibiotic and therefore the antimicrobial agents should be used only after testing their susceptibility against respective clinical isolates.

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