

# Duration of Levofloxacin Therapy in Intensive Care Units at a Large Academic Medical Center

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## BACKGROUND

At The University of Kansas Hospital (KUH), levofloxacin is the formulary fluoroquinolone antibiotic. It is indicated as first-line or alternative therapy for both community and healthcare-associated pneumonia, and urinary tract infection. The recommended dose and duration of levofloxacin vary from 250mg-750mg for 3 to 60 days depending on indication and severity of illness.

Research indicates that resistance is growing, partly due to increased and prolonged exposure to this drug class. Using high-dose, short-course therapy may maximize concentration-dependent killing and reduce the potential for resistance to emerge while maintaining noninferior efficacy. Data from this research project will help identify potential areas of improvement with regards to adherence to length of therapy recommendations in published guidelines. Adherence to published guidelines may help decrease or slow development of resistance and reduce treatment failures by ensuring that patients are only exposed to these antibiotics for the minimally efficacious time period.

## OBJECTIVES

- To determine average length of levofloxacin therapy in intensive care units (ICUs) based on indication
- To compare lengths of therapies at KUH to recommendations in evidence-based guidelines and primary literature

## METHODS

- A report was created using the electronic medical record database to identify patients admitted to intensive care units who received levofloxacin during the study period of August 18, 2010 to October 18, 2010
- Charts were retrospectively reviewed for levofloxacin indication, dose, route, and duration
- Patients were excluded from the study if they had only received one dose of levofloxacin or were receiving prophylactic therapy
- If patients transferred out of the ICU prior to completing the course of therapy, the total duration of therapy was counted, unless a specific duration was clearly stated in ICU progress notes
- If patients were discharged from the hospital before a course of therapy was completed, only the days the patient received levofloxacin in the hospital were counted towards duration of therapy
- The most current practice guidelines were reviewed to determine recommended durations of therapy based on prescribed indication, and compared to collected patient data

## RESULTS

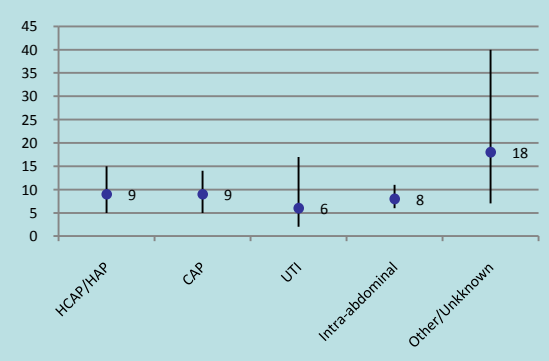
- FDA-approved and guideline-recommended durations of therapy are listed in Figure 1
- 180 patients were included in the study. Three patients received two separate courses of levofloxacin during the study period
- 42% of patients in the study received a full course of levofloxacin therapy
- Maximum, minimum, and average duration of therapy for each levofloxacin indication are represented in Figure 2
- Reasons for discontinuation of levofloxacin therapy are listed in Figure 3

Figure 1. FDA and guideline-recommended durations of levofloxacin therapy

Indication	FDA-approved Dose/LOT	Guideline-recommended Dose/LOT
Complicated UTI/ pyelonephritis	750mg qday x5 days or 250mg qday x10 days	7-14 days
Community-Acquired Pneumonia	500mg qday x7-14 days or 750mg qday x5 days	≥ 5-14 days
Hospital-Acquired or Healthcare-Associated Pneumonia	750mg qday x7-14 days	750mg qday x7 days (unless pseudomonas)
Complicated Skin and Skin Structure Infection	750mg qday x7-14 days	7-14 days
Intra-Abdominal Infection	not indicated	750mg qday x 4-7 days
Other/ unknown*	n/a	n/a

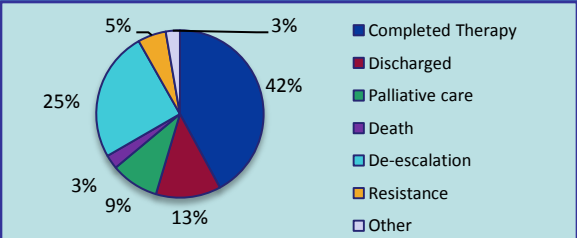
\*other/unknown indications include cystic fibrosis exacerbation and sepsis due to an unknown source

Figure 2. Average Length of Therapy for Patients Receiving a Full Course of Treatment (N=77)



## RESULTS

Figure 3. Reasons for levofloxacin discontinuation



## DISCUSSION

- Lengths of therapy of levofloxacin in the intensive care units at KUH are comparable to guideline-recommended lengths of therapy
- Patients receiving full courses of therapy for healthcare-associated or hospital-acquired pneumonia were treated for an average of two days longer than recommended by current treatment guidelines
- Patients being treated for unknown or other indications were treated for the longest duration (average 18 days), while patients with urinary tract infections or pyelonephritis were treated for the shortest duration (average 6 days)
- Completion of therapy (42%) and de-escalation of antibiotic regimen (25%) were the most common reasons for discontinuation of levofloxacin
- The most commonly documented indication for levofloxacin in ICUs at KUH is healthcare-associated or hospital-acquired pneumonia. Many patients with unknown sources of infection may initially be included in this indication, and determining whether criteria was met for these indications was outside the scope of this study.

## CONCLUSIONS

- Limitations**
- Retrospective data review relies on the clinician to accurately document past medical history and indication for each patient
  - Once patients are transferred out of the ICU, length of therapy is determined by a different medical team and may not accurately reflect ICU physician prescribing trends
  - Treatment guidelines are subject to interpretation and clinical judgment must always take precedence over guideline recommendations
  - Treatment guidelines may not have been published recently and may not reflect emerging resistance patterns or newly published literature
- Further Direction**
- The study can be expanded to include other services and medical teams to determine overall hospital prescribing trends
  - This data can be further analyzed to determine whether patients empirically treated with levofloxacin had susceptible organisms cultured, or whether resistant organisms were cultured after previous exposure to levofloxacin