

Introduction:

Cipro (ciprofloxacin) is a fluoroquinolone antibiotic. As a broad spectrum antibiotic, this medication has been found to be effective in the treatment of infections caused by wide array of pathogens. Coverage includes *P. aeruginosa*, and other gram negative aerobes, such as *H. flu*, *E. coli*, *Klebsiella sp.*, *Proteus sp.* and *Neisseria*.

Ciprofloxacin inhibits bacterial DNA-gyrase and the relaxation of supercoiled DNA promoting breakage of double stranded DNA thereby disrupting bacterial protein synthesis.

There is risk of abnormal changes in electrical activity of the heart (QTc interval prolongation), glucose control and possible risk of tendon rupture in patients > 60 years old with the use of ciprofloxacin.

Due to the potential for drug interactions, concomitant use of strong CYP1A2 inhibitors and Tizanidine (Zanaflex) with ciprofloxacin is contraindicated. Furthermore, patients that are on ciprofloxacin and QT prolonging agents should be closely monitored for evidence of ciprofloxacin toxicity (QT Prolongation and tendon rupture).

Analysis:

The purpose of this study is to evaluate the prescribing of ciprofloxacin (250 mg and 500mg oral tablets) and the possibility of concomitant drug interactions; specifically QTc prolongation. A total of 92 patients from Hill Air Force Base clinic (Pharmacy site 649) were retrospectively reviewed for drug interactions and appropriate dosing for ciprofloxacin from 01 Mar 2012 to 22 Jun 2012.

Results:

Number of Patients: 92	No interactions: 51 (55%) Drug Interactions: 36 (39%) Never Picked up/Not filled: 5 (5%)
Dosing	Twice daily dosing: 87 (95%) Use as directed: 5 (5%)
Interactions:	QT prolongation: [Total: 15 (16%)] <ul style="list-style-type: none">• Fluconazole (7)• Citalopram (3)• Nortriptyline (2)• Paroxetine (1)• Ondansetron (1)• Azithromycin (1) Concurrent/Prior Antibiotic Therapy: [Total: 12 (13%)] <ul style="list-style-type: none">• Macrobid (6)• Septra (4)• Doxycycline (1)• Metronidazole (1) Seizure risk: [Total: 7 (8%)] <ul style="list-style-type: none">• Ibuprofen (5)• Celebrex (2)

Interactions Continued:	<p>Tendonitis potentiating: [Total: 7 (8%)]</p> <ul style="list-style-type: none"> • Steroids (4) • Flovent (1) • Advair (2) <p>Prenatal vitamins (absorption interaction): [Total: 4 (4%)]</p> <p>Pgp-ABCB1: [Total: 3 (3%)]</p> <ul style="list-style-type: none"> • Lipitor (2) • Trazodone (1) <p>Hypoglycemia/hyperglycemia: (1%)</p> <ul style="list-style-type: none"> • Glimepiride (1)
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Discussion

Ninety-five percent of the prescriptions written by our providers for ciprofloxacin were for the recommended twice daily dosing. The majority of prescriptions, fifty-five percent, did not flag a drug interaction. However, QTc prolongation accounted for the majority of drug interactions detected and comments in CHCS in these instances indicated that either the provider or the patient was consulted about the possibility of QT prolongation while using ciprofloxacin. Most prescriptions for ciprofloxacin, except for 5, were dispensed.

FDA review of Azithromycin (Zithromax) safety

In May of this year, a study was published in the New England Journal of Medicine that may impact prescribing practices with regard to azithromycin (Zithromax). This study compared the risks of cardiovascular death in patients treated with azithromycin, amoxicillin, ciprofloxacin (Cipro), levofloxacin (Levaquin), and no antibacterial drug (placebo). The study reported a small increase in cardiovascular deaths and in the risk of death from any cause in persons treated with a 5-day course of azithromycin (Zithromax) compared to persons treated with amoxicillin, ciprofloxacin, or placebo. The risks of cardiovascular death associated with levofloxacin treatment were similar to those associated with azithromycin treatment. The FDA is reviewing the results from this study and will communicate any new information that results from its review.

Recommendations

Pharmacy will continue to review all new and refill requests of ciprofloxacin to ensure FDA guidelines are being followed. Providers will be contacted and changes will be documented in CHCS in all instances that are deemed necessary to ensure patient safety and maximize therapy.

Patients currently taking azithromycin should not stop taking their medicine without first talking to their healthcare professional.

Healthcare professionals should be aware of the potential for QTc interval prolongation and heart arrhythmias when prescribing or administering certain antimicrobial drugs.