ORIGINAL RESEARCH ARTICLE

Clin Drug Invest 2006; 26 (6): 323-328
1173-2563/06/0006-0323/$39.95/0

Ciprofloxacin Bioavailability is Enhanced by Oral Co-Administration with Phenazopyridine

A Pharmacokinetic Study in a Mexican Population

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Abstract

Background and objective: In Mexico, urinary tract infections (UTIs) constitute the second most frequent type of infections treated at primary-care clinics. Ciprofloxacin has played a major role in the treatment of UTIs because it has a broad spectrum of antibacterial activity. In addition to antimicrobial agents, phenazopyridine has been used to alleviate symptoms that occur during episodes of UTI. Thus, the present study was designed to compare the pharmacokinetic behaviour of ciprofloxacin administered alone versus ciprofloxacin combined with phenazopyridine.

Patients and methods: Twenty-four healthy male Mexican volunteers participated in this project. The study was carried out with a single oral dose of ciprofloxacin 500mg. The double-blind, crossover, randomised, balanced trial design comprised two treatments, two periods and two sequences. After administration of the study medication, serial blood samples were collected for a period of 12 hours. The harvested plasma was analysed for ciprofloxacin by high-performance liquid chromatography. The area under the concentration-time curve to last measurable concentration (AUC_t), area under the concentration-time curve extrapolated to infinity (AUC_∞), peak plasma concentration (C_{max}), time to reach C_{max} (t_{max}), mean residence time (MRT), elimination constant (k_e) and elimination half-life ($t_{1/2}$) were determined from plasma concentrations of both treatments and considered as primary variables for statistical analysed.

Results: While there were no differences between the two treatments in terms of C_{max} and k_e, AUC_t and AUC_∞ were 35% and 29% higher, respectively, in the combined treatment arm. Moreover, a significant delay in t_{max} (from 1 to 1.5 hours) and a statistical increase of 29% in MRT were also observed with phenazopyridine co-administration.

Conclusion: Oral co-administration of phenazopyridine increases ciprofloxacin bioavailability with regard to the amount absorbed (AUC) and permanence in the body (MRT), which could be useful during treatment.