

Editorial

Antagonism of vitamin C and vitamin E on action of quinolones

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The quinolone antibiotics are potent drugs for combating infections caused by various bacterial species with satisfactory results and relatively minimal adverse effects. Antioxidant dietary supplements, such as vitamin C (ascorbic acid) and vitamin E (α -tocopherol), are occasionally prescribed along with quinolone antibiotics during the course of treatment of an infection. Therefore it is important to understand the effects of these antioxidants on the antibacterial action of quinolone antibiotics.

Pfister et al.⁽¹⁾ conducted a study using 4 groups of 12 young Wistar rats. Group I was given normal feed, group II was given vitamin E-enriched feed and group III magnesium-enriched feed, while group IV was given feed enriched with magnesium and vitamin E, all for 10 days. All groups received ciprofloxacin (CPFX) at a dosage of 600 mg. Vitamin E was shown to reduce the number of abnormalities in the pelvic and femoral bones.

Gurbay et al.⁽²⁾ studied the cytotoxic effects of CPFX in fibroblasts given pretreatment with vitamin E, in comparison with those given no vitamin E pretreatment. Vitamin E pretreatment of the cells provided significant protection against CPFX-induced cytotoxicity; lowered the level of lipid peroxidation significantly. It was concluded that CPFX cytotoxicity was due to oxidative stress in the fibroblasts and that pretreatment with vitamin E was capable of protecting the cells. A subsequent study conducted by Gurbay et al.⁽³⁾ on CPFX cytotoxicity in rat astrocytes also concluded that CPFX-induced cytotoxicity is related to oxidative stress.

Masadeh et al.⁽⁴⁾ conducted a study on the effects of CPFX-induced oxidative stress on a number of reference bacterial strains and the protective effects of vitamin C and vitamin E on these bacteria. The bacteria used were *P. aeruginosa* ATCC 27853, *E. coli* ATCC 25922, *S. aureus* ATCC 29213, and clinical isolates of MRSA (methicillin resistant *S. aureus*). The inhibitory activity of CPFX on the test bacteria was determined by calculating the minimal inhibitory concentration (MIC), while oxidative stress was assessed through measurement of H_2O_2 production by means of FACScan flow cytometry. The bacteria pretreated with vitamin C and vitamin E were found to be protected from CPFX-induced cytotoxicity. This study demonstrates the antagonistic effect of vitamin E and vitamin C administration on the bactericidal effects of CPFX, when given concurrently during treatment of infections. More recently, the antioxidant ubiquinone (coenzyme Q10) demonstrated protective effects on human Achilles tendon cells exposed to ciprofloxacin and moxifloxacin.⁽⁵⁾ Oxidative stress frequently occurs in the mitochondria, and fluoroquinolone-induced oxidative damage to mitochondria in tenocytes and chondrocytes has been reported. Fluoroquinolones are important antibiotics with immense therapeutic value, and

the effectiveness of treatment by these drugs may be affected by dietary intake and cellular levels of these antioxidants. Overall, these antibacterial agents can be considered safe and well tolerated drugs. Patients should always be counseled regarding the risk associated with fluoroquinolones, even when they are prescribed according to standard recommendations.

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