

Tendon Rupture as a probable side effect of Ciprofloxacin: A review article

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Abstract

Ciprofloxacin is a broad-spectrum antibiotic from fluoroquinolones which are used to treat gram negative and positive bacterial infections. In last twenty years, tendinopathy is a worrying side effect. The side effects of tendon disorders including pain on tendon, angle tenderness, tendinitis and tendon rupture risk. Based on these symptoms various cases are shown and calculated. After several weeks pause in ciprofloxacin treatment the symptoms of tendon disorders are reduced.

Ciprofloxacin is a broad spectrum antibacterial agent against gram negative bacteria and also gram positive (recently), anaerobic bacteria which belongs from the class of fluoroquinolones which are used for treatment of different bacterial infections ranging from urinary tract infections to respiratory tract infections [1-3]. It functions by inhibiting DNA gyrase and a type II topoisomerase, topoisomerase IV, necessary to separate bacterial DNA, thereby, inhibiting cell divisions [4-6]. Common side effects of fluoroquinolones are gastrointestinal effects (such as vomiting, nausea and diarrhoea), central nervous system reactions (from mild one such as sleeplessness, headache and dizziness to sever). Also Ciprofloxacin can cause skin tumors due to photosensitivity

Keywords: Ciprofloxacin; Antibiotic; Fluoroquinolones; Tendon rupture; Tendinopathy; Tendinitis; Side effects

Introduction

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anaerobic bacteria which belongs from the class of fluoroquinolones which are used for treatment of different bacterial infections ranging from urinary tract infections to respiratory tract infections [1-3]. It functions by inhibiting DNA gyrase and a type II topoisomerase, topoisomerase IV, necessary to separate bacterial DNA, thereby, inhibiting cell divisions [4-6]. Common side effects of fluoroquinolones are gastrointestinal effects (such as vomiting, nausea and diarrhoea), central nervous system reactions (from mild one such as sleeplessness, headache and dizziness to sever). Also Ciprofloxacin can cause skin tumors due to photosensitivity. Unlike other antimicrobial agents, fluoroquinolones have shown CNS effects (dizziness, headache, drowsiness, insomnia, organic psychosis and convulsions) as the second most frequently form of toxicity [7,8]. This might be due to the blood-brain barrier penetration or lipophilicity of fluoroquinolones [9-11]. Additionally, according to several case reports and investigations, tendinitis or tendon ruptures might be a probable side effect [12-14]. It is proved by laboratory tests and case reports

Case Reports

There are several case reports as following which are mentioned with the respect of low to high doses of Ciprofloxacin. Damuth, et al. reported a case that a woman suffered from kidney disease and consumes 250 mg ciprofloxacin per day for several days. This elderly person undergoes tendinitis which was improved after two days of ciprofloxacin cessation. He also concluded that fluoroquinolone should be used with caution in UTI especially in patients with advanced age and renal dysfunction [17]. Among all of the most important reports, a case report was about an old man who was administered 250 mg ciprofloxacin twice daily for his lower respiratory tract infection. After six days, he felt pain and snap on his calf which was the symptoms of tendon rupture, known after the

examination [18]. Also, Karistinos and Paulos [19] revealed in the case report that a patient had taken a four weeks treatment for prostate infection with oral ciprofloxacin (800 mg/ day). After 30 days completion of the treatment, complain was reported regarding the bilateral proximal anterior thigh deformity and also mild knee extension weakness in the year 2017.

Beside all these reports, Muzi et al. reported two cases of tendinitis and tendon rupture in kidney transplant recipients. The first one was a woman who received 500 mg twice a day for 10 days; after six months of transplantation for a urinary tract infection which leads to joint pain and edema after five days of treatment. These symptoms reversed one month later due to fluoroquinolone therapy for recurrent Urinary Tract Infection (UTI). The latter one was a woman who received ciprofloxacin for 7 days. After that she experienced pain in Achilles tendon with edema [23]. Also other same reports strengthen the relative conclusion of tendinopathy with ciprofloxacin.

Results and Discussion

To evaluate the aspects of mechanism of quinolone-induced tendotoxicity, a piece of tendon from a Caucasian patient was used. Monocytes were incubated by different concentrations (0, 3, 10, 30 and 100 mg/L) of ciprofloxacin for up to 4 days. Effects were investigated by electron microscopy and immune-blotting. The results show structural changes (like condensed materials in nucleus, swollen cell organelles and apoptotic bodies at the cell membrane which induced tendinopathy) by the concentration of 3 mg/L which were intensified by higher concentrations and incubation period.

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