Original article

Effect of long-term treatment with therapeutic doses of enrofloxacin on chicken articular cartilage

T. Maśłanka, J.J. Jaroszewski

Department of Pharmacology and Toxicology, Faculty of Veterinary Medicine, University of Warmia and Mazury, Oczapowski Street 13, 10-718 Olsztyn, Poland

Abstract

Quinolone-induced arthropathy has been observed after a single very large dose, or after several moderately large doses in juvenile animals of multiple species. The purpose of the present study was to determine whether long-term treatment with therapeutic doses of enrofloxacin has a detrimental effect on chicken articular cartilage. 21-day-old broiler chickens were treated orally with 10 mg/kg/day of enrofloxacin for 10, 20 and 35 days. 24 hours after the last dose, the animals were killed and the femoral head with condyles and tibial condyles were subjected to a gross and histopathological investigation. The necropsy did not reveal macroscopic visible pathological changes in the articular cartilage surface, as well as in soft tissues surrounding joints in any of the animals from this study. Also, light microscopy evaluation did not show significant histopathological changes in any of the specimens from either experimental and control animals. In conclusion, our results indicate that treatment with a therapeutic dose of enrofloxacin for a period exceeding the recommended duration of therapy does not cause arthropathy in growing chickens. Moreover, the results obtained seem to indicate that chondrotoxicity of quinolones does not have a cumulative nature.

Key words: enrofloxacin, quinolones, arthropathy, chondrotoxicity, chickens

Introduction

Enrofloxacin, a fluoroquinolone antimicrobial agent, is widely used in veterinary medicine. Broad antibacterial activity, low rate of bacterial resistance, high oral bioavailability, extensive tissue penetration, and long elimination half-lives are characteristic features of fluoroquinolones (Brown 1996).

Despite the potential value of these antibacterial compounds, the use of fluoroquinolones is restricted because of their toxic effects on articular-epiphyseal cartilage complexes (in this paper we use simplified description: articular cartilage). For this reason, these drugs are not approved for pediatric use, and their use is limited in juvenile dogs (Brown 1996). Moreover, the use of quinolones in juvenile horses (especially in neonates) has not been recommended (Davenport et al. 2001). Quinolone-induced arthropathy has been described after a single very large dose, or after several moderately large doses in juvenile animals of multiple species such as dogs (Burkhart et al. 1990, Takizawa et al. 1999), rats (Machida et al. 1990, Stahlmann et al. 1995), rabbits (Machida et al. 1990), and guinea pigs (Bendele et al. 1990). However, chon-