



Case Report

Alopecia a potential adverse side effect of albendazole use in alpacas

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ARTICLE INFO

Keywords:

Albendazole
Alpaca
Vicugna pacos
Fiber loss
Alopecia

ABSTRACT

Albendazole is a benzimidazole derivative with anthelmintic activity. It is the treatment of choice for fasciolosis. The use of albendazole in South American camelids is common, however, there are no studies about the pharmacokinetics and pharmacodynamics of albendazole in alpacas and llamas. In the present study, a case of fiber loss (alopecia) in alpacas is described because of the suspected use of a high dose of albendazole. In a fasciolosis control program of an alpaca ranch located in the district of Nuñoa in Puno, Peru, 2184 alpacas were oral treated with albendazole (35–40 mg/kg). After 2 weeks of treatment the alpacas began to show loss of fiber in the abdomen, flanks and neck. The alpacas showed no other sign of disease. The alpacas recovered their fiber after 6 months. We suggest studies are needed to determine the safe dose of albendazole in alpacas.

Albendazole is the antiparasitic drug commonly used in humans and domestic animals. This drug, as well as other benzimidazoles, is first metabolized in the liver, rapidly becoming its active metabolites (Bogan and Armour, 1987). The mode of action of benzimidazoles is binding to the intracellular b-tubulin of the parasite which is responsible for the formation of microtubules, which are necessary for cell division (van Genderen and van Hellemond, 2012). Albendazole has demonstrated a broad spectrum of anthelmintic activity against helminth parasites both in humans and animals including tapeworm, gastrointestinal and lung nematodes, and zoonotic agents such as *Taenia solium*, *Fasciola hepatica* and *Echinococcus granulosus*. (Gonzalez et al., 2012; Horton, 2000; Horton, 1997).

There is evidence that albendazole can cause significant adverse reactions in humans and animals (Gozukucuk et al., 2013; Gruntman et al., 2009; Stokol et al., 1997; Veraldi et al., 2012). Albendazole has been shown to be toxic in dogs, cats and pigs producing mainly myelosuppression (anemia, leukopenia and thrombocytopenia) and severe prostration, complete anorexia, and lethargy, respectively (Gonzalez et al., 1995; Stokol et al., 1997). Also, albendazole administration to domestic animals causes clinical abnormalities like abortion, teratogenicity, ataxia, vomiting, and diarrhea (Gonzalez et al., 1995; Meyer, 1998; Stokol et al., 1997). Some reports mention albendazole toxicosis in alpacas. It has been associated with severe neutropenia, enteropathy and death (Gruntman et al., 2009). This report describes a

case of alpaca fiber loss (alopecia) caused probably by albendazole toxicosis.

This case occurred in “La Ensenada” alpaca ranch located in the district of Nuñoa in Puno, Peru. This area is a hyperendemic area of fasciolosis caused by *F. hepatica*. A total of 2184 alpacas, 612 tuis (6–10 months-old) and 1572 adults (over 1 year-old), were treated using albendazole (Vermiprazol; Hipra Laboratory, Spain) during the rainy season (January–February) for a control program of fasciolosis. The owners decided to use a high single oral dose of albendazole (35–40 mg/kg) because they assumed that the alpacas were infected with *Fasciola*. Alpacas were fed on cultivated grass in grazing lands and were only kept in corrals at night. After 1 to 3 days after dosing, some alpacas mainly tuis, showed moderate fever (40–41 °C). Alpacas with fever were treated with ketoprofen (2 mg/kg) for 3 days and a hepatoprotective drug (Hepato-Ject®; Agrovet Market Animal Health, Peru). After 2 weeks of treatment, the alpacas began to show loss of fiber mainly in the areas of the abdomen, flanks and neck which worsened as the days went by (see Fig. 1). However, the alpacas showed no signs of skin pain, loss of appetite, or fever. The alpacas began to recover as time passed and after 6 months, they had all recovered their fiber.

Cutaneous reactions related to albendazole use have been reported in humans and domestic animals (Chai et al., 2004; Ochoa et al., 2006; Zoran et al., 2001). Albendazole is the main drug used in the treatment of human echinococcosis. At high doses, alopecia is reported in humans

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<https://doi.org/10.1016/j.vprsr.2019.100297>

Received 10 March 2018; Received in revised form 19 March 2019; Accepted 23 April 2019

Available online 24 April 2019

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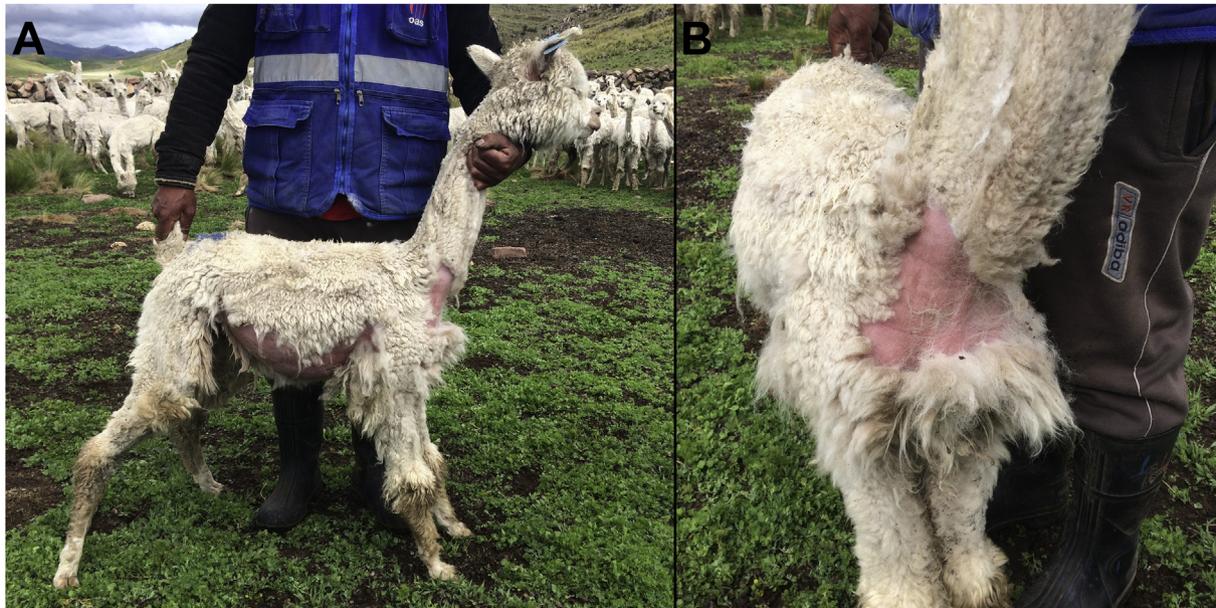


Fig. 1. Alpaca (túi) showing alopecia in the ventral zone (A) and in the neck (B).

as an adverse effect of this treatment (Horton, 2000; Horton, 1997; Steiger et al., 1990). It is very likely that something similar had occurred in the alpacas in this study which were treated with a single high dose of albendazole.

Some evidence have already been reported on the toxicity of albendazole in alpacas. A study by Gruntman et al. (2009), showed the presumptive albendazole toxicosis in alpacas where some of the animals died. Likewise, two of three adult alpacas developed severe and generalized fiber loss 3 weeks after the last dose of albendazole (19–33 mg/kg). In this case study, mortality in alpacas due to albendazole has not been reported. However, fiber loss was severe and generalized, and it started 2 week after the treatment similar to the results in Gruntman et al. study. In both cases, the dose of albendazole was chosen by the owners without consulting a veterinarian and in both cases, the alopecia resolved 5 to 6 months after the onset of the problem.

Unfortunately, there are no studies on albendazole pharmacokinetics and pharmacodynamics in alpacas. Therefore, it is difficult to determine why they show a susceptibility to the toxic effects of albendazole. Routinely used doses in alpacas are dose extrapolations from sheep and cattle (10 mg/kg) (Ballweber, 2009; Galvan et al., 2012). We suggest that further studies are needed to identify safe doses of this common antiparasitic drug used in alpacas.

Acknowledgements

The authors wish to thank Dr. Narry Tiao for the comments and critical of the text.

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