

## Scientific Report

# The effect of imidocarb dipropionate on babesiosis in sheep

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### Summary

Thirty four cases of babesiosis in sheep were diagnosed on the basis of clinical and laboratory findings. Eighteen of these sheep were infected by *Babesia ovis*, 14 by *Babesia motasi* and 2 had mixed infection of both of the species. The affected animals were treated with Imidocarb dipropionate at the dose rate of 1.2mg/kg body weight. One to two weeks later the animals were examined for any signs of disease. Imidocarb administration cured 94.4% of sheep infected with *B. ovis* and 78.5% of those infected by *B. motasi*. Three animals with severe anemia and high fever showed signs of drug toxicity.

**Key words:** *Babesia ovis*, *Babesia motasi*, Imidocarb, Sheep

### Introduction

Babesiosis in sheep is a tick-borne disease caused by the hemoprotozoan parasites, *Babesia ovis* and *Babesia motasi*. The disease is widely distributed in Africa, Asia and Europe and causes great economic losses (Habela *et al.*, 1990; Scott, 1991). Babesiosis due to *B. motasi* is serious and frequently fatal in the acute form; introducing a higher rate of parasitemia, while *B. ovis* infection shows less severe disease with a lower parasitemia (Shah-Fischer and Say, 1989; Soulsby, 1982). A number of drugs have been used to treat babesiosis in different animals. Imidocarb dipropionate, a carbanilide derivative is active against many species of *Babesia* in cattle and it also exerts a prophylactic effect against *Babesia* infections in cattle, mice and rats (McDougald and Robertson, 1988; McHardy, 1983).

A few reports have been made regarding the effectiveness of Imidocarb in treatment

of experimental and/or natural cases of *B. ovis* infection (Hashemi-Fesharaki, 1991; McHardy *et al.*, 1986). On the other hand no reports are available for efficacy of Imidocarb against *B. motasi* infection in sheep.

### Materials and Methods

During spring and summer of 1999, 34 cases of babesiosis were diagnosed in sheep in our Clinic. Diagnosis of the disease was based on the clinical signs including depression, high fever, anemia and dyspnea; and identification of piroplasmids of *Babesia* in peripheral blood smears stained by Giemsa's method. There were 18 cases of *B. ovis*, 14 of *B. motasi* and 2 of concurrent infection with the both *Babesia* species. Blood samples were collected from affected animals for packed cell volume (PCV) determination.

Imidocarb dipropionate (Imizol; Pitman-Moore) was used for treatment of infected animals as a 12% aqueous solution. The

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drug was injected intramuscularly at a dose of 1.2mg/kg body weight. Treated animals were kept for 1 hour after drug administration to detect any adverse reactions and they were clinically examined 7-14 days later for any signs of the disease. Statistical analysis for detection of any significant differences in PCV and result of treatment of sheep infected with 2 species of Babesia was done using Chi-square test and  $P < 0.05$  considered as significant.

## Results

Sheep infected with *B. ovis* and or *B. motasi* showed moderate to severe anemia (Table 1), however there was no significant difference in PCV between 2 groups of animals ( $P > 0.05$ ). The efficacy of Imidocarb dipropionate in treatment of *B. ovis* and *B. motasi* infection in sheep is showed in Table 1. Imidocarb dipropionate at a dose rate of 1.2mg/kg body weight cured 94.4% of animals infected with *B. ovis* and 78.5% of animals infected by *B. motasi*. Statistical analysis showed no significant difference in the effects of drug in controlling of two species of Babesia infection in sheep ( $P > 0.05$ ). One of two sheep with mixed infection of *B. ovis* and *B. motasi* died 3 days after drug administration.

Signs of drug toxicity such as salivation, incoordination and sweating were observed in 3 sheep 10-30 minutes after injection of Imidocarb. These animals had a high fever and evidence of severe anemia due to *B. ovis* infection. The adverse reactions were controlled by an intravenous administration of atropine sulfate at a dose rate of 0.04mg/kg body weight.

## Discussion

The findings of the present study showed that Imidocarb dipropionate with a dose of 1.2mg/kg body weight can be effective in treatment of natural cases of babesiosis due to *B. ovis* or *B. motasi* infection in sheep. These results are more or less in corroboration with reports of Hashemi-Fesharaki, (1991) who cured all field cases of *B. ovis* infection in sheep and goats with Imidocarb dipropionate. *B. motasi* is a large Babesia and resembles *B. bigemina* in cattle (Shah-Fischer and Say, 1989; Soulsby, 1982). Imidocarb dipropionate is very effective in treatment and/or sterilizing *B. bigemina* infection in cattle (McHardy and Simpson, 1974). *B. caballi*, a large Babesia in horses also is responsive to chemotherapy with Imidocarb (McDougald and Roberson, 1988). Babesiosis in sheep caused by *B. motasi* infection also is more severe than the disease caused by *B. ovis* infection (Shah-Fischer and Say, 1989; Scott, 1991). In our study sheep infected with *B. motasi* showed lower PCV than sheep infected with *B. ovis* although this was not statistically significant ( $P > 0.05$ ).

Morbidity and mortality rates of babesiosis in sheep can be high and up to 40% of untreated animals may die from anemic anoxia (Smith and Sherman, 1994; Scott, 1991). In experimentally induced Babesiosis in lambs, all untreated animals died following development of severe disease (McHardy *et al.*, 1986).

Although no signs of toxicity were reported by McHardy and his colleagues (1986) following intramuscular injection of 1.2mg/kg body weight of Imidocarb

Babesia species	sheep No.	PCV value%	recovery No.(%)	died No.(%)
<i>B. ovis</i>	18	22.9±5.4	17(94.4%)	1(5.6%)
<i>B. motasi</i>	14	19.1±4	11(78.5)	3(21.5%)

Table 1: The PCV values and result of treatment of sheep naturally infected with Babesia species by Imidocarb dipropionate



dipropionate in normal sheep, we did observe signs of adverse effect after administration of the drug. In the field cases, weakness due to pathological process and high fever may increase the risk of drug toxicity. On the other hand the marginal safety of Imidocarb is not high (Brander *et al.*, 1992) and giving an incorrect volume of the drug that is available only as 12% aqueous solution

may lead to drug intoxication. Therefore, it is notified that in sheep, required dose volume of the drug may be small and accurate measurement is important.

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### خلاصه فارسی

## بررسی اثرات دی پروپیونات ایمیدوکارب در درمان بابزیوز گوسفند

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ارزیابی اثرات دارو مورد معاینه قرار گرفتند. تزریق دارو ۹۴/۴٪ گوسفندهای مبتلا به بابزیوز ناشی از بابزیوز اوویس و ۷۸/۵٪ از گوسفندهای مبتلا و آلوده به بابزیوز موتازی را درمان نمود. سه رأس از گوسفندهای مبتلا که تب بالا داشتند و کم خونی شدیدی را نیز نشان می دادند متعاقب تزریق دارو علائم مسمومیت را بروز دادند. واژه های کلیدی: بابزیوز اوویس، بابزیوز موتازی، ایمیدوکارب، گوسفند

سی و چهار مورد بابزیوز در گوسفند بر اساس یافته های درمانگاهی و آزمایشگاهی تشخیص داده شد که ۱۸ مورد به بابزیوز اوویس و ۱۴ مورد به بابزیوز موتازی آلوده بودند. دو رأس از دامهای مبتلا نیز آلودگی به هر دو گونه بابزیوز را نشان دادند. دامهای مبتلا با تزریق داخل عضلانی ۱/۲ میلی گرم برای هر کیلوگرم وزن بدن از دی پروپیونات ایمیدوکارب تحت درمان قرار گرفتند. یک تا دو هفته بعد از تزریق دارو دامهای درمان شده برای

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