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Short communication

Trypanosomiasis by *Trypanosoma vivax* in cattle in the Brazilian semiarid: Description of an outbreak and lesions in the nervous system

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Abstract

An outbreak of trypanosomiasis by *Trypanosoma vivax* is reported in the semiarid of Paraíba, Northeastern Brazil from May to August 2002. Sixty-four cows out of 130 were affected; 11 died and the other recovered after treatment with diminazene aceturate. Affected animals had fever, anemia, weight loss, hypoglycemia, increased serum levels of aspartate aminotransferase and, in nine cows, nervous signs. All cows with nervous signs died; six of them recovered after treatment, but the disease relapsed. Six cows aborted and one delivered a calf that died immediately after parturition. Thirty-two out of 100 calves were affected and five died. Nervous signs were not observed in the calves. Gross lesions were thickening of the meninges, enlarged lymph nodes and prominent white pulp of the spleen. The main histological lesion was meningoencephalitis and malacia in the brain of cows with nervous signs. No antibodies against trypanosomes were found in 33 blood samples collected before the outbreak in the affected farm and in 29 samples collected at the same time in two other neighbor farms. Until January 2003, all 89 animals tested had antibodies against *T. vivax*, suggesting the occurrence of sub clinical infections in cattle without clinical signs. Only two out of 85 serum samples collected on April 2004 were positive for *T. vivax* antibodies. Data obtained suggested that the semiarid region is non-endemic for trypanosomiasis and that disease occurred due to introduction of the parasite in a susceptible population after an apparent rise in the *Tabanus* spp. population.

Keywords: *Trypanosoma vivax*; Trypanosomiasis; Cattle; Epidemiology; Semiarid; Brazil; Encephalomyelitis; Malacia; Nervous system

1. Introduction

In some African countries trypanosomiasis by *Trypanosoma vivax* is a very important disease of livestock (Anosa, 1983; Gardiner et al., 1989). African isolates of *T. vivax* are predominantly transmitted following cyclical development in tsetse flies. However, it can also be mechanically transmitted by other biting flies, and has therefore been able to spread beyond the African tsetse belt to Central and South America. In South America, *T. vivax* is only mechanically transmitted by biting flies, mainly tabanids (Gardiner, 1989; Otte and Abuabara, 1991; Jones and Dávila, 2001).

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In Africa, infected cattle ranged from totally asymptomatic chronic infections to wasting disease with severe haematological alterations and death (Losos and Ikede, 1972; Anosa, 1983; Gardiner, 1989). In South America, cattle infected by *T. vivax* are mostly asymptomatic (Desquesnes and Gardiner, 1993; Wells and Betancourt, 1977; Paiva et al., 2000; Garcia et al., 2006). However, the presence of *T. vivax* or antibodies against it was frequently demonstrated in several Latin American countries in cattle, buffaloes and sheep, including Brazil (Shaw and Lainson, 1972; Serra Freire, 1981; Silva et al., 1999; Dávila et al., 2003); French Guiana (Desquesnes and Gardiner, 1993); Bolivia (Silva et al., 1998); Colombia (Wells and Betancourt, 1977; Otte et al., 1994) and Venezuela (Garcia et al., 2006). Few outbreaks showing haematological alterations and clinical signs were described in South America. The first outbreak in South America was described in 1919 in a dairy farm in the French Guiana with high parasitaemias, sudden drop of milk production, anemia, weight loss, and the death of 95 out of 180 cattle (Leger and Vienne, 1919). In Colombia, cattle infected by *T. vivax* showed anemia and progressive weight loss (Zapata, 1931). In one outbreak reported in Bolivia, *T. vivax* was detected in 25 out of 29 cattle examined and animals showed fever, anemia, abortion, loss of appetite, lethargy, and progressive weight loss (Silva et al., 1998).

In Brazil, *T. vivax* was identified by the first time in a buffalo with fever and weight loss (Shaw and Lainson, 1972). Later, Silva et al. (1996, 1999) reported a *T. vivax* outbreak in the State of Mato Grosso, in the Pantanal region; with parasite in the blood of 10 out of 29 cattle and the following clinical signs: fever, anemia, abortion, loss of appetite, lethargy, progressive weight loss, oftalmitis, and dysentery. Further studies of naturally infected herds demonstrated that *T. vivax* normally did not cause disease in Brazil, inducing a chronic and asymptomatic infection despite cattle, buffaloes and sheep presented parasites detectable by microhematocrit and/or antibodies (Ventura et al., 2001; Dávila et al., 2003).

The identification of *T. vivax* in cattle in the Pantanal region, a very important livestock-producing area, led to the supposition that the disease will cause important economic losses and their dissemination to other Brazilian regions was considerer very probably (Silva et al., 1999; Jones and Dávila, 2001). Nevertheless, this hypothesis was not confirmed, with all reported outbreak so far restricted to Pantanal region. Nowadays, *T. vivax* is commonly found in enzootic equilibrium in the Brazilian Pantanal and surroundings (Ventura et al., 2001; Dávila et al., 2003). In this paper an outbreak of trypanosomiasis by *T. vivax* is reported in cattle in the Brazilian semiarid.

2. Materials and methods

Trypanosomiasis by *T. vivax* occurred in a herd of Brown Swiss and crossbreeds cattle in a farm in the municipality of Catolé do Rocha, state of Paraíba, Northeastern Brazil, located 6°20′38″ Latitude West, and 37°44′48″ Longitude South. The climate is semiarid, hot and dry, with a mean temperature of 27.8 °C (minimal of 20.2 °C and maxima of 35.4 °C) and a mean humidity of 50%. The mean annual rainfall is ∼500 mm, and the rains occur from January–February to May–June. The irregular distribution of the rains, a long dry period, and the occurrence of draughts of sometimes more than 1 year are characteristic of the region. The affected herd was grazing during the day, but at night it was kept in a corral and supplemented with corn silage, sorghum grain, sugar cane, urea and a mineral supplement.

Diagnosis of *T. vivax* was done morphologically by analysis on buffy coat smears and confirmed by *T. vivax*-specific PCR (Ventura et al., 2001). The presence of antibodies was detected by ELISA employing a total extract of *T. vivax* as antigen. The technique was previously standardized regarding sensitivity and specificity in seroepidemiological studies done in the Pantanal region (Madruga et al., in preparation). Treatment of *T. vivax* infected animals was performed by the inoculation of 5 mg/kg bw of diminazene aceturate. Hematological and hystopathological analysis were performed as in previous study (Batista et al., 2006).

3. Results and discussion

The first cases occurred in the beginning of May 2002, in a herd of 120 cows (100 milking and 30 dry cows), with cattle presenting a drop in milk production from a mean of 6–2.5 l daily per cow. In addition, clinically affected animals had depression, anorexia, fever, severe anemia, and progressive weight loss. Eight cows had nervous signs of incoordination, hypermetry, muscular tremors, fasciculations, opisthotonos, blindness, and strabismus. In five cows, nervous signs, including blindness, were transitory and the animals recovered after treatment, but later the disease relapsed with nervous signs, and the cows died. Before the diagnosis of trypanosomiasis, affected cattle were treated with tetracycline, amino acids, physiologic serum, vitamins of the B complex, and fluprednisolone. Some animals recovered, others died in 8–10 days, and others had a chronic phase with continuous weight loss of up to 23% of their live weight,