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First Incidence of Caprine Besnoitiosisin Kaduna State of Nigeria

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Abstract: A total of 226 goats were carefully examined during a survey to determine the prevalence of besnoitiosis in Kaduna State, Nigeria. At ante mortem examination no signs of besnoitiosis were observed in any of the goats and no gross lesions of the disease occurred on their skins examined, after slaughter, at Anchau, Giwa and Soba slaughter slabs. Skin specimens were obtained from the neck area after the postmortem inspection and preserved in 10% buffered neutral formalin. Microscopic examination of Haematoxylin and Eosin stained sections, of 145 of the skin specimens which were processed, revealed an intradermal aggregation of Besnoitia cysts in a Kano-brown doe. The intact cysts stimulated no inflammatory reactions but those with degenerated cyst-walls initiated infiltration of mononuclear cells to the site. All sections from the remaining 144 specimens were negative of the disease. An incidence of 0.7% was recorded for caprine besnoitiosis in Kaduna State, Northern Nigeria.

Key words: Besnoitia cysts, goat, incidence, microscopic, mononuclear, Kaduna

INTRODUCTION

The earliest report of caprine besnoitiosis was from Kenya in which the author described his observation of Besnoitia cysts in Haematoxylin and Eosin sections of previously dried skins (Bwangamoi, 1967). Such cysts were also discovered later in sections of lungs (Kaliner, 1973) and the eyelids (Heydorn *et al*., 1984) of goats affected with besnoitiosis.

Besnoitiosis was reported in wild and domestic goats of Iran, the manifestation of which were dullness, anorexia, skin ulcerations, thick, rough and encrusted skin and scrotum. In addition, there were partially sloughed off scrotum and white gritty subcutaneous nodules in some of the affected goats (Cheema and Toofanian, 1979). At the early stage caprine besnoitiosis showed acute orchitis and fever, but during the chronic phase, testicular atrophy, poor to very good body conditions, alopecia, hyperkeratosis and conjunctival cysts were observed (Njenga *et al*., 1999).

Besnoitia besnoiti is the cause of besnoitiosis in cattle, but sheep, goats and rabbits are also susceptible (Pols, 1960). Experimental studies, however, indicated that rabbit, rats, mice, hamsters, guinea pigs, sheep, cats and cattle are refractory to the Besnoitia species which causes caprine besnoitiosis in Kenya (Ang and Kasigazi, 1994; Njenga *et al*., 1993). It was suggested, therefore, that the name *Besnoitia caprae* be adopted for this goat strain (Njenga *et al*., 1993). This suggestion was strengthened by results of electron microscopy, which showed that *B. caprae* differed from *B. besnoiti* (Njenga *et al*., 1995).

There seems to be paucity of information on caprine besnoitiosis in Nigeria and to the best of our knowledge has not been reported in Kaduna State. This present study reveals the incidence of besnoitiosis in a goat in Kaduna State, Nigeria.

MATERIALS AND METHODS

In a survey of caprine besnoitiosis in Kaduna State, Northern Nigeria 226 goats were examined. At Anchau slaughter slab 137 goats were sampled, while 58 and 31 were from Giwa and Soba market slaughter slabs, respectively. In each case a preslaughter examination was conducted, followed by a careful postmortem inspection of the skins. This was done monthly on market days between November, 2001 and June, 2002.

A skin specimen of 1×1 cm was obtained from the neck region, thus avoiding damages capable of affecting

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the price of the whole skin. Each specimen was immediately fixed in 10% buffered neutral formalin until the time of processing.

These were later trimmed, processed manually and embedded in paraffin wax. Sections were cut at 5 μm thick from each block, mounted on glass slides and stained with Delafield's haematoxylin and 1% stock alcoholic eosin as described in a manual (Luna, 1968).

The slides were examined carefully under the light microscope and photomicrographs were taken using Olympus® photomicroscope in Department of Veterinary Pathology and Microbiology, Faculty of Veterinary Medicine, Ahmadu Bello University Zaria, to illustrate the findings.

RESULTS

All the goats examined and sampled were of good body conditions, alert and had no signs of illness. There were also no gross lesions indicative of besnoitiosis on the skins at postmortem inspection.

Histopathology, however, revealed inflammatory cellular infiltrations in all the skin sections from the goats examined. In a 3 year old Kano-brown doe from Anchau area of Kaduna state, an aggregation of Besnoitia cysts were seen at one point in the section of the skin, a few others singly existed elsewhere, within the dermis. Four categories of cysts were observed as described below: One had a rough degenerating cyst-wall and its cystozoites were within, in the dermis of the skin (Fig. 1), some had almost normal cyst-walls but with out cystozoites within, while macrophages were seen within some degenerated cysts (Fig. 2), some of the cysts had degenerated walls and exposed the cystozoites. Some focal pericystic mononuclear cellular infiltration which were predominantly macrophages, were found in the affected area (Fig. 3).

No inflammatory reactions occurred around the intact cysts. The finding of a single case out of 145 skin specimens examined during this study gives a 0.7% incidence of caprine besnoitiosis within Kaduna State.

Fig. 1: Photomicrograph of a skin section from a goat naturally infected with *Besnoitia besnoiti B. caprae*). Note Besnoitia cyst B) in the dermis. H and E stain. X 250

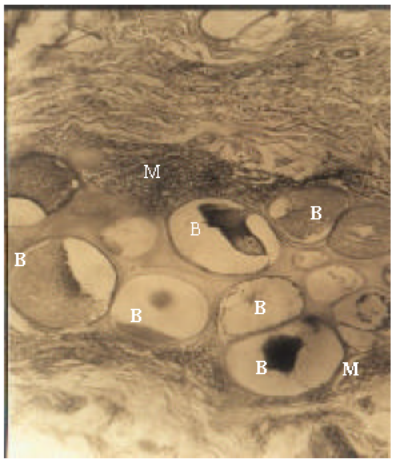

Fig. 2: Photomicrograph of the same skin in Plate 1 Note the Besnoitia cysts (B) and pericystic cellular infiltration (M) in the dermis. H and E stain. X 250

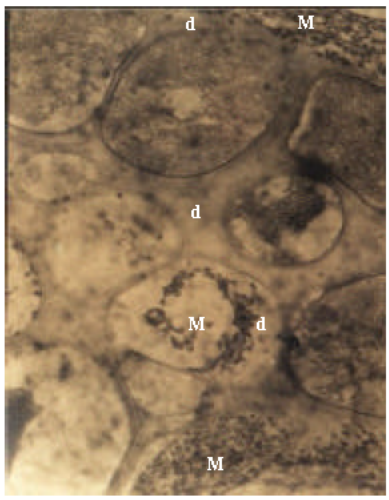

Fig. 3: Photomicrograph of the skin from the same goat, at higher magnification. Note the cystozoites (arrow heads) and macrophages (m) at the periphery and in a degenerated cyst. H and E stain. X 400

DISCUSSION

Clinical signs and gross pathological lesions were observed in goats (Bazargani *et al*., 1987) but in the present study neither of these was seen. It is known, however, that goats which appear to be in good body conditions and without detectable external abnormalities on the skin could have masses of Besnoitia cysts in the subcutis (Njenga *et al*., 1993). Grossly, no abnormalities occurred in our case except that Besnoitia cysts were seen in the skin section.

An inapparent form of besnoitiosis was reported in Nigerian cattle, which had neither clinical signs nor gross lesions suggestive of the disease, but Besnoitia cysts were found in skin sections (Oduye, 1974). The case in this present report may, possibly, have been a subclinical caprine besnoitiosis, or it might be that the animal was recovering from the disease.

The finding of intradermal aggregation of the cysts, some of which were degenerating and attracted infiltration of macrophages is in agreement with an earlier report (Bwangamoi, 1967). Their observation of extensive acanthosis, hyperkeratosis, necrosis and atrophy of hair follicles and granulation tissue around the cysts, along with lymphocytes and plasma cells were not in our experience. These differences are not likely due to variation in sites of sampling on the skin but may have contributed. We preferred the neck region while other investigators (Njenga *et al*., 1999; Nazfi *et al*., 2002) obtained their specimens from the skin on the lateral aspect of the thighs and over the tarsal, metatarsal, carpal and metacarpal joints.

This first report has recorded a low, 0.7% incidence of caprine besnoitiosis in Anchau area of Kaduna state, Northern part of Nigeria. It is not comparable to the range of 1-36% prevalence in 8 provinces of Kenya were the disease is endemic(Njenga *et al*., 1999).

CONCLUSION

We recommend a serological survey of besnoitiosis in Nigerian goats. This will help to give a better insight on the insidious economic losses being incurred due to the disease among our goats.

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