Spontaneous infections of tick-borne blood parasites in splenectomized indigenous sheep and goats in Ibadan, Nigeria

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Infections spontanées à hémoparasites transmis par les tiques chez des moutons et chèvres indigènes splénectomisés à Ibadan, Nigeria — Des chèvres de Sokoto et des moutons nains d'Afrique de l'Ouest achetés localement ont été splénectomisés après vérification de l'absence de toute infection par des hémoparasites ou par des helminthes. Des parasites ont été trouvés dans le sang des deux espèces, 6 jours après la splénectomie. Après coloration des étalements on a observé *Babesia motasi, Anaplasma ovis, Theileria ovis* et *Eperythrozoon.*

La parasitémie était plus élevée chez les moutons que chez les chèvres, mais alors qu'il existait des signes d'anémie chez ces dernières, aucun symptôme n'était décelé chez les premiers. L'auteur discute de la signification de ces résultats au regard de l'épidémiologie des infections des petits ruminants transmises par les tiques au Nigeria. *Mots clés :* Petits ruminants - Chèvre de Sokoto - Mouton nain d'Afrique de l'Ouest - Splénectomie - Maladie transmise par les tiques - *Babesia motasi* - *Anaplasma ovis* - *Theileria ovis* - *Eperythrozoon* - Nigeria.

INTRODUCTION

It has often been asserted that in a tropical country such as Nigeria, a state of endemic stability exists between livestock especially ruminants and some tick-borne blood parasites. There had been no experimental proof of this assertion for a wide range of blood parasites common in Nigeria's small ruminants (2). Only KUIL and FOLKERS (6) obtained spontaneous infection of one blood parasite, *i.e. Anaplasma ovis* in splenectomized indigenous sheep and goats in northern Nigeria.

In this short paper, we report the tick-borne parasitic infections which developed spontaneously in sheep and goats after splenectomy.

MATERIALS AND METHODS

Thirty indigenous goats of the Red Sokoto breed and thirty West African dwarf sheep which were purchased locally from villages around Ibadan were used. Before purchase, it was ensured that the sixty animals were free of any ectoparasite including ticks. Using teeth dentition (4), the average ages of the goats were estimated as 20 months and the sheep 24 months. The animals were first dewormed with Nilverm® (Tetramisole, 15 mg/kg body weight). As soon as the faeces were free of helminth eggs, the goats were randomly divided into three groups, consisting of 10 goats per group. Group 1 : non-parasitized goats ; group 2 : non-parasitized splenectomized goats ; group 3 : parasitized splenectomized goats. Similar groupings were carried out among the sheep. Thin blood smears were made from the ear veins of each of the animals fixed in methyl alcohol and stained with Giemsa. The smears were rigorously inspected under oil immersion of a binocular microscope to detect the presence of any blood parasite. The animals were then splenectomized as described by ANOSA *et al.* (1) and subsequently kept in a tick-free pen. Clinical observations including temperature, were made daily until 35 days after splenectomy. On every occasion when there was a rise in temperature, blood smears were made, stained with Giemsa and examined for the presence of blood parasites. On such occasions, the values of Packed Cell Volume (PCV), haemoglobin and numbers of red and white blood corpuscles in the blood were determined. The goats were killed by electrocution after 35 days and post-mortem performed on them.

RESULTS

Goats

Table I shows the blood parasites encountered in non-parasitized ; non parasitized splenectomized ; and parasitized splenectomized goats and the blood values. These parasites were seen as from the 6th day post-splenectomy and the parasitaemia was generally low throughout the course of infection ; at no time was more than 1 p. 100 of the erythrocytes parasitized in the parasitized splenectomized group. The blood values showed pronounced anaemia and leucocytosis as a

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TABLE I Parasites encountered in smears and average haematological values of blood of goats.

Group	Experimental animals	No. of goats/ group	PCV p. 100	Hb gm p. 100	RBC $\times 10^6$	WBC $\times 10^3$	Rate (p. 100) of matured erythrocytes parasitized	Parasites identified in blood smear
1	Non-parasitized goats	10	26.1	8.59	12.33	16.10	Nil	*Babesia motasi* *Anaplasma ovis*
2	Non-parasitized splenectomized goats	10	25.8	8.60	11.60	15.80	Nil	*Theileria ovis*
3	Parasitized splenectomized goats	10	9.5	1.80	2.10	25.80	1	

result of the presence of the parasites. The daily temperature fluctuates widely ranging from 38.5-40.5 °C with concentrated peaks occurring towards the later stages of the infection.

Post-mortem findings showed that the subcutaneous tissue was dry. The subcutis was devoide of fat. The tongue epithelium was discoloured while the trachea was haemorrhagic and full of bloody and frothy exudates and these extend as far as the bronchioles. The lungs were pale white but there was no evidence of consolidation. There was diffuse haemorrhage along the whole length of the small intestine. The bone marrow was pale.

Sheep

Table II shows the parasites found in the blood of the splenectomized sheep and the blood values. Like the goats the parasites were first seen in the blood 6 days after splenectomy but the parasitaemia, with averagely 10 p. 100 of the erythrocytes parasitized, was higher than that of the goats. There was no anaemia as the pre- and post-splenectomy values of PCV, haemoglobin and red blood cells were comparable. There was however distinct leucocytosis. The temperature fluctuated widely and it was above normal for most part of the infection. Clinical and parasitological observations ceased 35 days after splenectomy but the sheep died on the 53rd day post-splenectomy.

DISCUSSION

This investigation shows that the commonest blood parasites of sheep and goats in Nigeria are *B. motasi, A. ovis, T. ovis* and *Eperythrozoon* species. KUIL and FOLKERS (6) had similarly demonstrated *A. ovis* in splenectomized sheep and goats in northern Nigeria although they were of different breeds from those used during this investigation. DIPEOLU (2, 3) and ILEMOBADE (5) had also reported these parasites in the migratory sheep and goats slaughtered in the abattoirs in different parts of Nigeria. This is however the first time that so many tick-borne blood parasites are obtained spontaneously after splenectomy. The results indicate the existence of premunity against these parasites in the Nigerian small ruminants. The endemicity of the diseases in Nigeria ensures the acquisition of the infections at young age and this

TABLE II Parasites encountered in smears and average haematological values of blood of sheep.

Group	Experimental animals	No. of sheep/ group	PCV p. 100	Hb gm p. 100	RBC $\times 10^6$	WBC $\times 10^3$	Rate (p. 100) of matured erythrocytes parasitized	Parasites identified in blood smears
1	Non-parasitized sheep	10	27.4	8.42	7.50	15.20	Nil	*Anaplasma ovis* *Babesia motasi*
2	Non-parasitized splenectomized sheep	10	26.8	8.30	7.80	16.10	Nil	*Theileria ovis* *Eperythrozoon* spp.
3	Parasitized splenectomized sheep	10	27.0	8.54	8.60	33.30	10	

involves premunity in the survived ones. Because there are abundant tick vectors (3) to maintain this state of premunity in the endemic environment, a state of endemic stability exists between the small ruminants and the tick-borne blood parasites. Parasitaemia and disease become evident only when the animals are subjected to stresses and strains such as splenectomy (as seen in this investigation) or hoof migration as evident in DIPEOLU's results (2, 3).

The differences in the course of the diseases in the experimental sheep and goats need further clarification. While the parasitaemia was low in the goats there was pronounced anaemia, and, whereas the parasitaemia was higher in the sheep, there was no anaemia. Leucocytosis was common to both of them and this is a testimony of immune response in both small ruminant species. Further work on these aspects are going on in our laboratory. ■

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Locally purchased indigenous goats of the Red Sokoto breed and West African dwarf sheep were splenectomized after they had been certified free from any infection with blood or helminth parasite. Clinical observations were made on the splenectomized animals and blood smears were made on every occasion when there was a rise in their temperature.

Parasites were seen in the blood of both animals 6 days after splenectomy and those seen from the stained smears were *Babesia motasi, Anaplasma ovis, Theileria ovis* and *Eperythrozoon*. The parasitaemia was higher in the sheep than in the goats but while there was anaemia in the latter, there was none in the former. The significance of the results *vis a vis* the epidemiology of tick-borne infection of small ruminants in Nigeria is discussed.

Key words : Small ruminants - Red Sokoto goat — West African dwarf sheep — Splenectomy - Tick-borne disease - Babesia.

MAJARO (O. M.), DIPEOLU (O. O.). Infecciones espontáneas con hemoparásitos transmitidos por las garrapatas en el ganado local ovino y cabrío esplenectomizado en Ibadan, Nigeria. *Rev. Elev. Méd. vét. Pays trop.*, 1986, **39** (2) : 189-191.

Cabras de Sokoto y carneros nanos de África del Oeste, comprados localmente, fueron esplenectomizados después de la comprobación de la ausencia de cualquiera infección por hemoparásitos o por helmintos. Se observaron parásitos en la sangre de ambas especies 6 días después de la esplenectomia.

La coloración de preparaciones de sangre demostró la presencia de *Babesia motasi, Anaplasma ovis, Theileria ovis* y *Eperythrozoon*. La parasitemia era más elevada en los carneros que en las cabras, éstas teniendo síntomas de anemia mientras que los carneros no. El autor discute de la significación de dichos resultados en relación con la epidemiologia de las infecciones de los pequeños rumiantes transmitidas por las garrapatas en Nigeria.

Palabras claves : Pequeños rumiantes - Cabra de Sokoto - Carnero nano de África del Oeste - Esplenectomia - Enfermedad transmitida por las garrapatas - *Babesia motasi* - *Anaplasma ovis* - *Theileria ovis* - *Eperythrozoon* - Nigeria.

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