

Observations on an eosinophilic cutaneous ulcer of large ruminants in Northern Nigeria

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RÉSUMÉ

Observations sur un ulcère éosinophilique cutané chez de grands ruminants de Nigéria du Nord

Les auteurs signalent l'existence, chez les bovins et les chameaux de la Nigeria du Nord d'un ulcère cutané d'origine parasitaire qui ressemble par ses aspects extérieurs à celui causé chez le cheval par l'habronérose cutanée.

Chez les bovins, ce parasitisme se manifeste surtout sur le bétail des fermes et sur celui de la station de Recherches agronomiques de Shika, près de Zaria, avec une fréquence faible puisqu'elle n'atteint pas 1 p. 100 des effectifs concernés.

Ces ulcères, de forme ovale ou sphérique, dont la plus grande dimension peut parfois atteindre 20 cm, apparaissent dès le début de la saison des pluies, se manifestent tout au long de la saison humide, pour disparaître spontanément une fois la saison sèche survenue, avec parfois réapparition aux mêmes endroits, aux pluies suivantes.

Ils sont en général localement précédés par des blessures légères ou les égratignures que se font les animaux au contact des épineux ou des fils de fer barbelés, ce qui explique leur fréquence sur les côtes et les flancs des animaux atteints, alors qu'ils sont très rares sur le mufler, la tête ou la croupe.

Leur étude anatomo-pathologique a mis en évidence, à la base de l'ulcère, un tissu collagénique abondant et compact, largement infiltré par de nombreux éosinophiles avec présence de larves vermiformes dont l'identification n'a pu être encore faite de façon précise et certaine.

Anatomiquement ces larves ressemblent superficiellement à *Agamofilaria boophaga*, tenu par FAIN et HERIN (1955) pour l'agent causal de l'ulcère cutané des bovins de Rwanda-Urundi.

Elles ont été trouvées chez 2 des 250 *Musca* sp. récoltées sur des bovins porteurs d'ulcères cutanés.

Les auteurs pensent que ces bovins ne sont que des hôtes accidentels du parasite ; celui-ci leur serait communiqué par des Muscides jouant le rôle de vecteurs mécaniques, à partir d'un Spiruride propre aux lézards, serpents ou rongeurs vivant à proximité des installations ; ces animaux sont tous connus comme habituellement infectés de filaires ou Spiruroïdes divers.

INTRODUCTION

Parasitic cutaneous ulcers have only occasionally been reported from African cattle. Stephanofilariasis, an important cause of bovine ulcers in other parts of the world, appears to be uncommon in Africa. Its suspected occurrence was

reported in Nigeria but has not been confirmed (ODUYE, 1972).

FAIN and HERIN (3) observed parasitic ulcers affecting the skin of cattle in Ruanda Urundi and described a helminth larva, *Agamofilaria boophaga*, as the causative agent.

In Nigeria, similar ulcers were for the first time noticed in cattle in the Shika Research Station (near Zaria) in 1963 and were subsequently recognised in other parts of northern Nigeria (5)

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mainly in cattle belonging to settled livestock owners or to government stations.

Similar lesions have been observed in camels from Zaria, Sokoto and Hadejia (6). This communication presents some preliminary observation on the ulcer as observed in Nigerian animals.

MATERIALS AND METHODS

Clinical observations were made on cattle from various farms and especially from the Shika Agricultural Research Station. Samples were obtained from slaughter animals in Zaria and Bauchi as well as from three cattle and one camel, obtained after surgical removal in the Faculty.

Representative parts were fixed in 10 p. 100 buffered formaline and later sectioned and stained in haematoxylin and eosin. Other parts were cut into bits and digested in pepsine HCL (5 gram pepsine and 7 cc HCL in 100 cc water) ; the recovered helminth larvae were fixed in alcohol 70 p. 100 and stored in alcohol-glycerol.

During March and April, 1975 just before the onset of the rains, 250 *Musca* spp. were collected from and around an ulcer of a cow in Zaria and dissected.

RESULTS

Clinical observations

The prevalence rate in cattle was low, usually less than 1 p. 100. Most of the affected animals showed only one lesion ; exceptionally two ulcers were found on the same animal.

Lesions occurred mainly at the beginning and during the wet season and tended to heal spontaneously during the dry season, but did sometimes reappear in the following wet season. In a camel the ulcer was excised four times in three years and reoccured each time.

The ulcers were nearly always preceded by a small wound or scratch, often due to rough handling in crushes or along fences. Reason why the lesions were most frequently found on the body sides (Photo 1) ; they were less frequently found on the head, muzzle, legs and croup. The lesions cause considerable irritation as demonstrated by continuous licking of the ulcers by animals.



Photo 1. — White Fulani cow with large ulcer. Note the dried blood on the nose and muzzle, due to licking the ulcer.

At the beginning of the dry season the lesions tend to dry up and obtain the aspect of a « cemented floor » or disappear completely.

Gross Pathology

The ulcers were oval to circular and varied from a few cm, to over 20 cm in diameter, tending to become larger as ulcers developed. They were circumscribed, the edge being sharply demarcated from adjacent skin. The skin became thicker towards the lesion and was thickest along the border of the ulcer giving it the appearance of a rolled edge. The underlying dermis was often affected for a considerable distance under apparently normal epidermis.

The surface of the ulcer was usually depressed becoming more so centrally and was composed of fresh granulation tissue covered with a dark dried crust of serum, blood and debris. Occasionally, the skin was so thickened that the ulcer protruded above the surface for several centimeters resembling a tumourous mass with ulcerated surface. Hyperpigmentation and loss of adnexa were typical in the ulcer of the camels.

Excised ulcers were difficult to cut and consisted of extremely dense collagenous tissue in which small greenish-yellow foci of exudate were embedded (Photo 2).

Histopathology

Microscopically, early ulcers were characterised by loss of epidermis, extensive infiltration by granulation tissue, and a few helminth larvae surrounded by thick cuffs of eosinophils, many of which had undergone necrosis.



Photo 2. — Section through a cutaneous ulcer. Note the dense collagenous tissue.

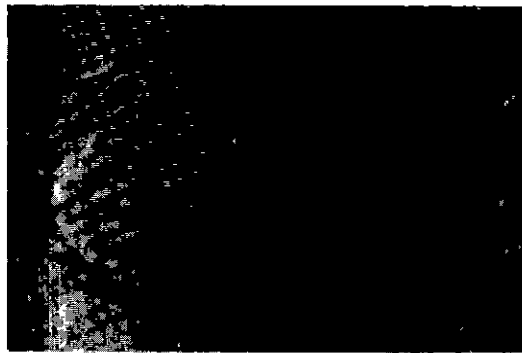


Photo 3. — Anterior end of Agamofilaria larva.

In the later stages the fibrous tissue developed to dense collagenous tissue causing a marked thickening of the dermis. Helminth larvae were rarely found in this stage although the infiltration and the foci of eosinophils persisted.

The lesions tended to spread laterally in the dermis undercutting the normal epidermis and into the subcutaneous muscles. The latter presented histological changes similar to the granulomatous form of eosinophilic myositis. Underlying skeletal muscle was never found to be affected.

Parasitology

Helminth larvae were recovered most frequently from the superficial layers of the ulcer and were always found in low numbers. The number of larvae recovered after pepsine digestion was 24 from one ulcer and 19 from the other.

Larvae ranged in length between 2.8 and 5.1 mm (mean 3.6) and in width between 0.05 and 0.07 mm. Their cuticle was rather thick and cross striated (striations in centre of body 0.0025-0.0028 mm apart).

The head was characterised by an enforced anterior part (Photo 3) showing an internal ring of six elongated and pointed papillae, surrounded by a ring of four round papillae and two larger flat ones, the head was always clearly visible even when larvae had undergone partial digestion.

The tail carried one terminal and two lateral papillae. The digestive tract was composed of a short œsophagus and a simple intestine terminating in a rectal vesicle. The anal pore was sub-terminal and characterised by a slight thickening of the cuticle.

Out of the 250 *Musca* spp. dissected, two were found infected with helminth larvae similar to those recovered from the ulcers. One larva was found in the thorax, whereas the other was found in the head.

DISCUSSION

Superficially the larvae appeared similar to those described by FAIN and HERIN (3), they were a bit thinner and the distribution of the papillae on the head seemed different. Another difference with the description of FAIN and HERIN is the fact that only a few larvae could be found in each. Professor CHABAUD (Paris) examined some of the Nigerian larvae, which had been dried out however, and observed shorter deirids and a slightly different posterior morphology compared to those described from Ruanda Urundi, suggesting an unknown *Parafilaria* sp. Dr. LICHTENFELS (Beltsville) however noticed some similarity with gnathostomatid larvae. A definite identification has yet to be made and must wait collection of more suitable specimens.

It should be noticed, in relation to the aetiology of the disease, that the infection was always preceded by an initial wound or small lesion. It is suggested that these predisposing lesions attracted flies (Photo 4) which probably introduced the helminth larvae. These were apparently a cause of an irritation considering the continuous licking and scratching of the lesions by the host. It is likely that this licking and scratching aggravated the lesions.

The low infection rate in the dissected *Musca* spp. (2 out of 250) was not surprising in view of the low number of larvae which had been recovered from the ulcers. The similarity between the larvae from the ulcers and those from the flies



Photo 4. — Flies on a cutaneous ulcer.

suggests that the flies could transmit the larvae ; it remains possible from this limited study however that the larvae in the flies were an incidental finding.

The infection in cattle is probably accidental and the larvae do not develop further, the condition being analogous to cutaneous habronemiasis in horses.

The fact that the infection was mainly found in animals from settled herds and that the most likely intermediate or transport host was a non-biting fly indicates that the final host should be found in an animal which is commonly occurring around settlements. Rodents, lizards and snakes are quite common around human dwellings in Northern Nigeria and they are known to be infected with filarids and spiruroides (1, 2).

Acknowledgements

We gratefully acknowledge the assistance of Professor A. N. MOHAMMED and Messrs. H. T. YESUFU and F. AMADU SUKA in the entomological part of the investigations. The interest and suggestions of Professor A. G. CHA-BAUD, Muséum National d'Histoire naturelle, Paris and of Dr. J. R. LICHTENFELS, Animal Parasitology Institute, Beltsville, U. S. A. are highly appreciated.

SUMMARY

Observations on a eosinophilic cutaneous ulcer of large ruminants in Northern Nigeria

Circumscribed cutaneous ulcers, resembling cutaneous habronemiasis in equines have been observed in cattle and camels from various parts in northern Nigeria. The ulcers which sometimes reached a diameter of 20 cm were pathologically characterised by extremely dense collagenous tissue, extensive infiltration by eosinophils and by the occurrence of helminth larvae. These larvae resembled *Agamofilaria boophaga* and were also found in 2 out of 250 *Musca* sp. collected from an infected cow. The authors suggest that the cattle are accidental hosts of the helminth which is probably having rodents or lizards as a final host.

RESUMEN

Observaciones sobre una úlcera eosinofílica cutánea de los grandes rumiantes en Nigeria del norte

Se observaron en bovinos y en dromedarios de varias áreas del norte de Nigeria úlceras cutáneas.

Las dichas se parecen a las de la habronemosis de los équidos. Llegan a unos 20 cm y se caracterizan por un tejido colágeno compacto, una infiltración extendida de eosinófilos y la presencia de larvas de helmintos. Se encontraron estas larvas pareciéndose a *Agamofilaria boophaga* en 2 de las 250 *Musca* sp. recogidas sobre una vaca infectada.

Los autores suponen que los bovinos son huéspedes casuales de esto helminto cuyos huéspedes finales probablemente son los roedores o los saurios.

REFERENCES

1. AVERY (R. A.). A preliminary list of parasites collected from reptiles and amphibians in N. Nigeria. *Brit. J. Herpetol.*, 4 : 217.
2. BAYLISS (H. A.), LANE (C.). A revision of the Nematode family Gnathostomidae. *Proc. Zool. Soc. Lond.*, 1920, 3 : 245.
3. FAIN (A.), HERIN (V.). Filarioses des bovidés au Ruanda Urundi. III. Etude parasitologique. *Ann. Soc. belge. Med. trop.*, 1955, 35 : 535.
4. ODUYE (O. O.). Stephanofilarial dermatitis of cattle in Nigeria. *J. comp. Path.*, 1971, 81 : 581.
5. ODUYE (O. O.). A clinical note : A bovine ulcerative dermatocis in Nigeria. *J. Nig. Vet. Med. Ass.*, 1975, 4 : 101.
6. SCHILLHORN VAN VEEN (T. W.), BARNES (H. J.). A note on a cutaneous eosinophilic ulcer of large ruminants in N. Nigeria. *Proc. 7th Conf. of the W. Ass. Adv. Vet. Parasit.*, Thessaloniki, 1975, p. 88.