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Clinical Outbreak of Dermatophilosis in Cattle in Kebbi State Nigeria and Review of Literature

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Authors' contributions

This work was carried out in collaboration between all authors. Author MSJ designed the study, performed the statistical analysis, wrote the protocol and final draft of the manuscript. Authors NNP, SG, ZS, and USA managed the analyses of the study. Authors MLS and YUD managed the literature searches. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

This case report described a clinical outbreak of dermatophilosis among cattle in a farm in Yauri Local Government Area of Kebbi State, Nigeria. Thirteen (22.4%) out of fifty-eight animals were symptomatic for dermatophilosis. The diagnosis of dermatophytosis was made by clinical signs present, characteristic appearance and locations of skin lesions and the macro and micro morphology of the *Dermatophilus* bacterium. Infection could be related to exposure to ticks which were observed in the farm and associated climatic and demographic predisposing factors. Infected animals were treated using two administrations of long-acting oxytetracycline at 20 mg/kg BW intramuscularly three days apart and ivermectin at 200 µg/kg subcutaneously. After three weeks, there was the resolution of the papules and crusts lesions leaving only soft pink-greyish scars on which hair regrowth was clearly visible.

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1. INTRODUCTION

Dermatophilosis is an acute or chronic contagious zoonotic exudative epidermitis with scab formation, caused by members of aerobic, Gram-positive actinomycete called *Dermatophilus congolensis* [1,2]. The disease is non-pruritic, and is characterized by exudative, proliferative or hyperkeratotic dermatitis, accompanied by the production of crusts and folliculitis [3]. The disease in cattle and sheep are commonly called cutaneous streptotrichosis and mycotic dermatitis respectively, although other local names exist including *Senkobo skin disease* in Central Africa, *Kirchi*in Nigeria, and *Saria* in Malawi.

The disease was first reported in cattle [4], in Belgian Congo with the name Dermatose contagieuse (Impetigo contagious). Dermatophilosis has been described in a wide range of animal host including terrestrial and aquatic habitats [5]. The disease is distributed worldwide but mainly recorded in African countries [6] and to some extent in Europe [7], Asia [8], Australia [9] and Americas [10]. The most affected domestic animals are cattle [11], sheep [12], horses [13], goats [14] and camels [15].

Dermatophilosisin cattle is an enzootic bacterial skin disease in tropical and subtropical countries; it may be an acute or chronic partial or progressive exudative dermatitis that could lead to the death of the animal and cause economic losses to farmers [16].

Transmission of *Dermatophilus congolensis* is through direct contact with infected animals, ticks, biting flies, and mosquitoes may also spread the infection [5]. Surveys of a large number of cattle in Africa reported prevalence approaching 15% with a 100% infection rate in some herds at the peak of seasonal prevalence [1].

Minor trauma, or maceration by prolonged wetting, allows the establishment of infection and multiplication of the organism in the epidermis. The formation of the typical pyramidal shaped crust is caused by repeated cycles of invasion into the epidermis by hyphae, bacterial multiplication in the epidermis, rapid infiltration of neutrophils, and regeneration of epidermis. The organism in the scab is the source for repeated and expanding invasions which occur until immunity develops and the lesion heals.

It is generally accepted that in the rainy season, owing to the devitalizing effect on the skin barriers, the high relative humidity significantly influence the maturation and motility of the infective zoospores, and it has been claimed to be a major predisposing factor in the spread and epidemiology of dermatophilosis [17].

The incidence of the disease is highest during the rainfall in tropical and subtropical regions, animals in which the disease regresses are usually re-infected in successive wet seasons [1], and the high seasonal incidence is associated with concomitant increases in tick and insect populations and infestations. Tick infestations, particularly with *Amblyomma variegatum, Hyalommaasticum and Boophilus microplus*is strongly associated with the occurrence of extensive lesions of dermatophilosis [18].

In cattle, the lesion commences as a circumscribed moist patch, often with raised or matted hairs, giving a characteristic ‘’paint brush‘’ appearance. Discrete lesions occur in the initial stages which coalesce to form large areas of hyperkeratotic scab and crust.

Distribution of the gross lesion usually correlates with the predisposing factors that reduce or permeate the natural barrier of the integument. Typical lesions consist of circular, dome-shaped scab 2-9cm in diameter. Scab may be of a variable thickness and on removal, show a concave underside coated in thick, yellowish exudates leaving a row of the bleeding epidermis [19]. Death usually occurs particularly in calves because of generalized disease with or without secondary bacterial infection and secondary fly or screw worm infestation [20].

There are breed differences in susceptibility to dermatophilosis. In Africa, the N’dama and Muturu cattle breeds and native sheep are resistant, while Zebu, White Fulani, and European breeds are susceptible [1].

Dermatophilosis leads to great economic losses in African countries [21] due to inferior wool and leather quality [9], death and culling [22], decrease milk production and increase in somatic cell count [23], decrease in semen quality [24] and the treatment expenses. In addition to its economic importance, the disease

plays a role in public health and can be transmitted to human [25,26].

This article reports a clinical outbreak of dermatophilosis among cattle on a farm in Yauri Local Government Area of Kebbi State Nigeria.

2. MATERIALS AND METHODS

2.1 Case History

In the first week of August 2014, The Large Animal Unit of the Veterinary Teaching Hospital, Usmanu Danfodiyo University Sokoto was consulted to a farm of 58 cattle in a closed herd in Yauri, Kebbi State, Nigeria. 13 (22.4%) out of the 58 animals had skin lesions which were mostly scabs, papules and crusty nodules observed to have persisted for about three weeks before presentation to the clinic. The herd consisted of beef cattle kept in a semi-intensive management system and fed with dry but dirty hay, bran and bean husks. The prevailing climatic condition was warm, humid with an average of ambient temperature of 39°C±0.3; it was also the peak of the rainy season in the geographical area.

2.2 Physical, Laboratory Examinations and Treatment

Physical examination of the affected animals in the herd showed wide areas of dermatitis presenting as scabs and papules with matting in some areas of the skin, the lesions extended to the entire body in some severely affected animals. The skin lesions were present on the dorsum, neck, shoulders, briskets, scrotum, perineum, udder and the caudal aspects of both hind limbs, these lesions varied from scabs to nodular circumscribes with extensive accumulation of crusts measuring up to 0.5 to 2 cm in diameter and varied in color from cream to brown. In some animals, there were matting which adheres to the hairs and evoke pain sensation by the animal on palpation (Figs.1,2 3 and 4).

Mean temperatures, Pulse rates and Respiratory rates recorded were 39.5°C ±0.5, 100 beats per minute ±0.7 and 42 cycles per minute ±0.2 respectively. Skins scrapes, crusts, and hair samples were taken and divided into two parts, one part was collected in a filter paper and the other part preserved in potassium hydroxide solution for onward transportation to the Veterinary Public Health and Preventive Medicine Laboratory, UsmanuDanfodiyo University Sokoto, Nigeria for analysis.

Direct smears were prepared and stained with Giemsa and observed under a light microscope using both low and high magnifications, the organisms are seen as branching filaments containing multiple rows of *cocci*.

For bacteriological examination, some crusts and plucked hair were homogeneously crushed in a glass mortar and inoculated into blood agar, incubated aerobically at 10% CO and 37°C for 48 hours. Examination of the stained colonies microscopically, revealed the presence of Gram-positive cocci arranged in long parallel-lines in the form of branched septate (both transverse and longitudinal plane) hyphae resulting in a "railroad-track" like appearance which is characteristic of *Dermatophilus congolesis*as [27].

2.3 Treatment

The infected animals were treated using two doses of long-acting oxytetracycline at 20 mg/kg BW intramuscularly three days apart, and for ectoparasites, Ivermectin injection at 200 µg/kg subcutaneously was used. Charmil® was applied topically to repel flies, minimize infection and encourage rapid healing.

3. RESULTS

The vital parameters were within normal limits, and there was an excellent resolution of skin lesions after three weeks. The inflamed crusted and matted skin segments were replaced by soft pink-greyish scars on which hair regrowth was clearly noted. Ticks were found in 10 (76.9%) of the 13 affected animals in the farm, the ticks were identified as *Amblyomma variegatum*.

3. DISCUSSION

Many studies have suggested a strong correlation between the rainy season and outbreaks or increases in the incidence of the disease in ruminants. [5], wrote that the incidence and severity of the disease are directly or indirectly related to high rainfall and humidity, this will probably corroborate the outbreak we encountered during the month of August which is the peak of the rainy season in the North-western part of Nigeria.

Fig. 1. Clumps of hair and crusts with matting

Fig. 2. Nodular Lesions on hind limbs

Fig. 3. Scabs lesions on neck Figure

Fig. 4. Dermatophilosis lesions on the back

The characteristic lesions observed in our case reports were those of scabs, papules and crusty nodules which have deleterious effects on quality and cosmetics of the skin. [28], reported a 50.8% loss of annual revenue expected from hides in Nigeria due to the infection of *Dermatophilus congolensis* in cattle, the author also added that dermatophilosis in cattle contributes 43.7% shortfall in meat expected from beef cattle, 20% drop in milk yield because affected lactating cows become unwilling to be milked due to painful lesions on their udder and teats.

The economic losses caused by dermatophilosis in the livestock subsector is not limited to Nigeria alone, [21], agreed that the disease leads to great economic losses in African countries due to inferior wool and leather quality. In fact, [29], reported that Nigeria was losing an estimated 10.3 Million naira (about 65,000USD) annually due to the effect of dermatophilosis on cattle hide, even that was later suggested to be a gross underestimate [30].

The lesions seen on affected animals in our report were dispersed almost entirely on the body surfaces but with concentration on the dorsum, this is in line with the studies of [31], who stated that the concentrations of lesions on the back in cases of dermatophilosis might largely be due to the activity of the Ox pecker (*Buphagus erythrorhgnchus*) which alights more frequently on the back of cattle. The back is also more exposed to wetness and maceration caused by rain, which will make it vulnerable to injuries by the Ox Pecker and

subsequent infection with the *dermatophilus* bacterium.

Ticks are known to play a major Epizootiological role in the transmission and spread of the disease [5]. The hard ticks *Amblyomma variegatum*, *Hyalomma spp* and biting flies mainly *Stomoxys spp* have been specifically associated with transmission of the disease. [32]. On this theme, [33], strongly associated the appearance of symptomatic dermatophilosis with tick infestations, he reported *Amblyomma variegatum*as the most important tick in the pathogenesis of the disease. This was recent re-emphasized by [18], who stated that *Amblyomma variegatum*is associated with transmission of *Dermatophilus congolensis*. Other arthropods like flies, mosquitoes, mites also serve as mechanical transmitters of the disease into deeper layers of the skin.

The isolation of *dermatophilus* bacterium from the mouth parts of ticks removed from the skin of infected cattle is suggestive of that narration [34]. Control of tick infestation in cattle may help to reduce the incidence of dermatophilosis, but the emergence of resistant strains has rendered most of the acaricides ineffective for field use in Nigeria [28].

The choice of oxytetracycline for treatment of the outbreak in our case report was based on the success of the drug in previously published data. [33], reported 85% cure rate with the administration of 2doses of oxytetracycline Long-Acting (TLA) two to three days apart. Topical application with povidone iodine, other topical agents like Charmil® and ataractics is also of value to repel flies, minimize infection and encourage rapid healing.

The high morbidity observed in our case report is likely due to in-contact transmission from infected or carrier animals to susceptible animals. The Farm manager was advised to improve nutrition, to avoid any undue exposures and predisposition that will cause trauma to the skin and routinely spray the pens and premises with Deltamethrin® solution to minimize and possibly prevent tick infestation

CONSENT

It is not applicable.

ETHICAL APPROVAL

As per international standard or university standard, written ethical approval has been collected and preserved by the author(s).

COMPETING INTERESTS

Authors have declared that no competing interests exist.

REFERENCES

1. Radostits OM, Gray CG, Hinchcliff KW, PD Constable. Veterinary medicine, A text book of the disease of cattle, horses, sheep, pigs, and goats.10thEdn. Saunders Elsevier. London. 2007;1048-1051.
2. Dallas JS, Kazeem HM, Makinde AA, Fatiyu, MY, Dashe GY. Bacterial associated with the pathology of bovine dermatophilosis in North-central Nigeria. Vet. Res. 2010;3:4-8.
3. Reddy SB, Prameela DR, Sivajothi S, Venkatasiivakumar R, Raju SKG. dermatophilosis in cross-bred cattle in Y.S.R District of Andhra Pradesh. Int. J. Sci. Env., 2014;3:1371-1374.
4. Van-Sacegham R. *Dermatose contagieuse* (Impetigo contagieux). Bull Soc. Path. Exot. 1915;8:354-359.
5. Zaria LT. *Dermatophilus congolenses* infection (dermatophilosis) in animals and man. An update. Compare. Immun. Microbiol. Infect. Dis. 1993;16:179-222.
6. Kassaye EI, Moser, Woldemeskel M. Epidemiological study on clinical bovine dermatophilosis in northern Ethiopia. Dtsch Tierarztl Wochenshr. 2003;110:422-425.
7. Stee A, Szezepanik MM, Golynski M, Kurek L, Mochol J, Smieeh A. Studies on outbreaks of dermatophilosis in dairy cattle. Medyeyna Weterynaryjna. 2005;61: 290-292.
8. Yeruham I, Elad D, Nyska A. Skin diseases in a Merino sheep herd related to an excessive rainy winter in a Mediterranean climatic zone. J. Vet. Med. 1995;42: 35-40.
9. Edwards JR, Gardner JJ, Norri RT, Love RA, Spicer P, Brynant R, Gwynn RV, Hawkins CD, Swan RA. A survey of ovine

dermatophilosis in Western Australia. Aust. Vet J. 1985;62:361-365.

10. Mikaelian I, Lapointe JM, Labelle P, Higgins R, Paradis M, Martineau D. *dermatophilus*-like infection in beluga whales, (*Delpinapterusleucas),* from the St. Lawrence estuary. Vet. Dermatol. 2001;12:59-62.
11. Razafindraibe H, Raliniaina M, Maillard JC, Rakotondravao. Renitelo cattle dermatophilosis and PCR-RFLP analysis of MHC gene. Ann. Acad. Sci. 2006;1081: 489-91.
12. Rad M, Tabar GRH, Chavoshi, M. A survey on dermatophilosis in sheep in the North of Iran. Iran. J. Vet. Res. 2004;5:97-101.
13. Hill AL, Tippet CE, Smith SJ, Peppard CJ. The suitability if Aloe vera products for the treatment of distal limb dermatophilosis in horses. Intern. J. Aromather. 2005;15:169-176.
14. Loria GR, La-Barbera E, Monteverde V, Sparagano OA, Caracappa S. Dermatophilosis in goats in Sicily. Vet. Rec. 2005;156:120-121.
15. Gitao CG, Agab H, Khalifalla AJ. Outbreaks of *Dermatophilosis congolensis* infection in camels (*Camelus dromedarius*) from the butane region in Eastern Sudan., Rev Sci Tewch. 1998;17:743-748.
16. All-Emmanuel N, Moudachirou M, Akakpo JA, Quetin-Lecterca J. Treatment of Bovine dermatophilosis with *Senna alata, Lantana camera, and Mitracarpus Scaber* leaf extracts. J. Ethno. Pharm. 2003;86: 167-171.
17. Yeruham I, Elad D, Perl S. dermatophilosis in goats in the Judean foothills. Revue Med. Vet. 2003;12:785-786.
18. Chatikobo P, Kusina NT, Humudikuwanda H, Nyoni O. A monitoring study on the prevalence of dermatophilosis and para filariasis in cattle in a smallholder semi-arid farming area in Zimbabwe. Trop. Anim. Health. Prod. 2004;36:207-215.
19. Andrew AH, Blawey RW, Boyd H, Eddy RG. Bovine medicine, disease, and husbandry of cattle. 2nd ed. United Kingdom, Black Well Science. 2003;886-887.
20. Kahn CM. The merck veterinary manual. 9thed. USA: Merck and Co. Inc. pp. 2005;690-691.
21. Woldemeskel M. Dermatophilosis: A threat to livestock production in Ethiopia. Diseh Tierarztl Wochenschr. 2000;107:144-146.
22. Yeruham I, Elad D, Perl S. Economic aspects of outbreaks of dermatophilosis in first calving cows in nine herds of dairy cattle in Israel. Vet. Rec. 2000;146:695-698.
23. Yeruham I, Friedman S, Elad D, Perl S. Association between milk production, somatic cell count and bacterial dermatoses in three dairy cattle herds. Aust. Vet. J. 2000;78:250-253.
24. Sekoni VO. Effects of severe chronic scrotal *Dermatopilus congolensis* (Kirchi) infection on semen characteristic in Zebu/Friesian crossbreed bulls and effect on long-acting Terramycin chemotherapy. There. 1993;40:211-223.
25. Harman M, Sekin S, Akdeniz S. Human dermatophilosis mimicking ringworm. Br. J. Dermatol. 2001;145:170-171.
26. Burd EM, Juzyeh LA, Rudrik JT, Habib F. Pustular dermatitis caused by *Dermatophilus congolensis.* J. Clin. Microbiol. 2007;45:1655-1658.
27. Carter GR, Cole GR. Diagnostic procedures in veterinary bacteriology and mycology. 5th ed. Academic Press, California. 1990;280-283.
28. Ikpeze OO. *Dermatophilus* infection in Nigeria: a mini review. Bio. Res. 2004;2:37-41.
29. Lloyd DH. The economic effects of Bovine streptothricosis In: *Dermatophilus* infection in animals and man, Llyod, D.H. and Sellers, C. (Eds). Academic Press, London. 1976;274-291.
30. Abdullahi US. Chemotherapeutic and Chemoprophylactic control of bovine dermatophilosis. Ph.D. Thesis, Ahmadu Bello University, Zaria, Nigeria. 2001;66-68.
31. Bida SA. Epizootiological and pathological studies of bovine dermatophilosis (Kirch) in Northern Nigeria. PhD Thesis, Ahmadu Bello University, Zaria Nigeria. 1973;45-52.
32. Lloyd CM, Walker AR. The systemic effect of adult and immature Amblyomma variegatum ticks on the pathogenesis of dermatophilosis. Rev. Elev. Med. Vet. Trop. 1993;46:313-316.
33. Awad WS, Nadra-Elwgoud MI, El- Sayed AA. Diagnosis and treatment of bovine,

ovine and equine dermatophilosis. J. App. Sci. Res. 2008;4:367-374.

34. Oppong ENW. The epidemiology of dermatophilosis infection of cattle in the Accra Plains of Ghana In: *Dermatophilus* infections in animals and man. D.H. Lloyd and K.C. Sellers (eds), Academic Press, London. 1976;17-32.

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