Consequences of Chronic Dermatophilosis on Semen Quality and Reproductive Performance of Friesian Bull in Multipurpose Farm in Zaria, Nigeria


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Abstract
Dermatophilosis is a contagious zoonotic skin disease with wide host range and most commonly affects cattle, sheep and horse. The principal causative agent is Dermatophilus congolensis which is a member of the aerobic actinomycete and has worldwide distribution. The disease is characterized by exudative dermatitis with scab formation, lameness, unwilling to mount is common if limbs are infected. Diagnosis can be made by demonstrating the characteristic appearance of the cocci on impression smears. Laboratory findings revealed normal values of some haematological indices with increased in white blood cell (WBC) prior to treatment especially WBC, 19.7 x109, lymphocytes, 97 %, monocytes, 90.5 % and neutrophils, 98.7 x109. Semen evaluation revealed increased in sperm morphological abnormalities, 55.0 % prior to treatment, but there was decrease in sperm volume 3.0 ml, sperm concentration 289.5 %, sperm motility 40.0 % and live sperm ratio 45%, two weeks post treatment the haematological parameters and semen characteristics became within the normal values . The aimed of this finding was to evaluate the effects of dermatophilosis on haematological parameters and semen characteristics of the Friesian bull. In conclusion Dermatophilosis had significant influence on semen quality that can disturb the economics of animal production.

Key words: Dermatophilosis, Haematological parameters, Semen quality, Unwilling to mount, Clinical signs, Friesian bull, Nigeria

Introduction
Dermatophilosis is a contagious zoonotic skin disease caused by members of aerobic actinomycete (Dalis et al., 2010). The exact causative agent of Dermatophilosis is Dermatophilus congolensis which is aerobic, actinomycete, a gram positive bacterium that produces motile zoospores (Hirsh et al., 2004). The
disease was first reported by von-soceghem (1915) in cattle in the Belgian Congo (Shoorijeh et al., 2008). Eventhough the disease affects a wide variety of animals and occasionally humans, the most commonly affected species are cattle, sheep and horses and rarely dogs and cats in many parts of the world (Dejene et al., 2012). The disease in cattle and sheep is commonly called cutaneous streptotrichosis and mycotic dermatitis respectively, and in horse rain scald, although other local names exist including senkobo skin disease in Central Africa, kirchi in Nigeria, and Saria in malawi. Dermatophilosis is a name common to the disease in all species (Radostits et al., 2007).

The disease is non-pruritic, and is characterized by exudative, proliferative or hyperkeratotic dermatitis, accompanied by the production of crusts and folliculilitis. It invades the skin and causes skin disease (Yeruham et al., 2003). The disease had been reported to be more severe in ruminants and was of particular importance in tropical and subtropical regions (Andrew et al., 2003). Some factors involved in the pathogenesis of Dermatophilosis are mechanical injury to the skin, rainfall, tick infestation, concurrent diseases and stress that compromise the host immune system (Gebreyohannes and Gebresselassie, 2013). It is generally accepted that in the rainy season, owing to devitalizing effect on the skin barriers, the high relative humidity has a significant influence on the maturation and motility of the infective zoospores, and it has been claimed to be a major predisposing factor in the spread of Dermatophilosis (Yeruham et al., 2003).

The organism can exist in quiescent form within the epidermis until infection is exacerbated by climatic condition. Epidemics usually occur during the rainy season (Hirsh et al., 2004). Shearing, dipping, or introducing an infected animal into a herd or flock can spread infection. The disease is transmitted by direct contact with infected animals or indirectly via contaminated objects or flies (Quinn et al., 2002). Moisture facilitates release of zoospores from preexisting lesions and their subsequent penetration of the epidermis and establishment of new foci of infection. High humidity also contributes indirectly to the spread of lesions by allowing increases in the number of biting insects particularly flies and ticks, that act as mechanical vectors (Radostits et al., 2007).

Diagnosis made based on clinical appearance of the lesion on the affected animal and demonstrating the causal organism from the lesions beneath the scabs (Kahn, 2005).

The treatment of Dermatophilosis still remains a matter of great concern owing to the recurrence of the disease and the difficulties to cure it using antibiotics by the parenteral route. Terramycin long-acting (TLA) was described to be the only drug effective in parenteral treatment of Dermatophilosis (Ilemobade et al., 1979), while 2 years later, it was claimed that animals treated with TLA became re-infected even after recovering from the disease (Ogwu et al, 1981). However, the focus is still on topical treatment of
Dermatophilosis, so many other treatments were tested mixing several natural drugs, regardless of the risk of toxicity and without scientific protocol, but none of them gave complete healing without recurrence (Nwufoh, 1985).

The outcome of treatment is influenced by the severity and extent of lesions. Parenterally administered antibiotics such as long acting oxytetracyclines are usually effective (Awad et al., 2008). Control and prevention measures are based on minimizing the effect of predisposing factors and early treatment of clinical cases (Quinn and Markey, 2003). The disease usually characterised by severe skin matting resulting in hide depreciation, decrease in animal productivity, reproductive performance and severe case mortality in susceptible weak animals (Stewart, 1997). The present article reports present a clinical Dermatophilosis among cattle characterised by poor semen quality and unwilling to mount in Multipurpose Integrated Livestock Farm in Zaria.

Case Report

Frisian bull was referred to a private Veterinarian in mid-September 2014, with a chief complaint of skin diseases and inability of the bull to mount Bunaji cows. The animal was part of a herd comprising 8 white Fulani bull and 4 Sokoto Gudali cows, the diseases did not affect the remaining cattle. The animals were under semi-intensive management system and the weather conditions were relatively warm and dry. Upon clinical examination of the referred bull, a dermatitis was noted which presented as numerous papules extending over almost the entire body especially the back, scrotum, limbs and perineal region. Each papule appeared as an area of matted hair which could be detached together with wet crust, eliciting a pain reaction in the animal leaving a raw, denuded, exudative lesion. The appetite and body temperature were normal, the bull is not willing to mount a cows and the limbs stifle joint were seriously affected by dermatitis.

Blood, semen, Hairs and crusts were collected and submitted to laboratory for haematological indices, semen analysis and identification of causative agent respectively. The blood were analysed for PCV and total blood count, semen characteristics were analysed as described by Iliyasu et al., 2014. While the hair and crusts were culture for bacteriological examination. The crust and hair were crushed in a mortar and inoculated on to Columbia agar with 5 % sheep blood (blood gar) (Difco, Detroit Michigan, USA). Incubation occurred at 37 % under 5 % CO2. After 24hrs, virtually pure culture of pinpoint greyish-white colonies surrounded by a fairly broad zone of complete hemolysis was obvious. After 48hrs the colonies were approximately 1mm, rough granular and pitting the medium. The Gram’s stain exhibited the typical morphology of *D. congoensis* which characterised by presence of coccoid cells arranged longitudinally in a chain consisting of a single or two parallel rows of this Gram’s positive coccoid cells. Semen was collected using electro ejaculator (Pulsate IV®) and analysed as described by Iliyasu et al., 2014.
Plate I. Showing cutaneous dermatophilosis on scrotum and hind limbs of Friesian bull prior to treatment

Plate II. Hairs regrowth on cutaneous of the shoulder and flank of the Friesian bull post treatment

**Diagnosis**

Based on clinical signs and laboratory confirmation, however some of the clinical signs were enumerated above.
Results and Discussion

Blood and semen were collected and analysed in clinical pathology laboratory and fertility laboratory respectively, at Aminu Kano Teaching Hospital, Kano, Nigeria. The hematological parameters results were presented in (Table I). Semen characteristics result was presented on (Table II). The clinical appearance of dermatophilosis was noted in this case on rump, back sides, neck, withers, legs and tail which is similar to the remark of (Babul Deba Nath, et al., 2003) and the lesions recorded in this case was generalized. However the haematological parameters in this case were affected compared to the absolute values. This may be attributed to the skin discontinuity that allowed exposure to secondary bacterial infection to penetrate into the system (Gebreyohannes and Gebresselassie, 2013). Localized ulcerative lesions on the groin, limbs neck and scrotum were also seen in this bull. Coalescence of several lesions affecting larger areas was very usual finding in cattle. Cattle with generalized skin lesions was found to be reluctant to graze profuse discharge, massive yellowish brown crusty and scaly lesions recumbent, dehydrated and weak within 7 days of appearance of clinical signs. This condition may be ascribed to upset the sperm quality as most of the nutrient required for spermatogenesis will not be adequate and slide hyperthermia due to secondary bacterial infection may compromise the sperm quality as reported by (Iliyasu et al., 2014).

Table 1: Haematological parameters of the patient (Friesian bull) with chronic dermatophilosis prior, post treatment and the absolute value

<table>
<thead>
<tr>
<th>Parameters/Values</th>
<th>PCV (%)</th>
<th>MCH (pg)</th>
<th>MCV (fl)</th>
<th>MCHC (g/dl)</th>
<th>RBC (x10^12/l)</th>
<th>PLT (x10^9)</th>
<th>WBC (x10^6)</th>
<th>Lymph (%)</th>
<th>Mono (x10^9)</th>
<th>Neutro (x10^9)</th>
<th>Eosino (x10^9)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient prior to treatment</td>
<td>38.8</td>
<td>9.8</td>
<td>15.6</td>
<td>289.0</td>
<td>4.5</td>
<td>80.5</td>
<td>19.7</td>
<td>97.0</td>
<td>90.5</td>
<td>98.70</td>
<td>0.50</td>
</tr>
<tr>
<td>Patient post treatment</td>
<td>39.5</td>
<td>11.4</td>
<td>21.9</td>
<td>350.0</td>
<td>5.3</td>
<td>110.0</td>
<td>10.0</td>
<td>35.3</td>
<td>29.9</td>
<td>25.8</td>
<td>0.20</td>
</tr>
<tr>
<td>Absolute values</td>
<td>24-46</td>
<td>11-17</td>
<td>40-60</td>
<td>300-360</td>
<td>5-10</td>
<td>100-800</td>
<td>4.0-12.0</td>
<td>2.5-7.5</td>
<td>0.0-0.8</td>
<td>0.6-4.0</td>
<td>0.0-2.4</td>
</tr>
</tbody>
</table>

Table 2: Semen characteristics of the patient (Friesian bull) with chronic dermatophilosis prior, post treatment and the absolute values

<table>
<thead>
<tr>
<th>Parameters/Values</th>
<th>Semen volume (ml)</th>
<th>Sperm motility (%)</th>
<th>Sperm concentration (%)</th>
<th>Sperm morphological abnormalities (%)</th>
<th>Sperm pH (°)</th>
<th>Live Sperm (%)</th>
<th>Sperm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patient prior to treatment</td>
<td>3.0</td>
<td>40</td>
<td>289.5</td>
<td>55.0</td>
<td>6.0</td>
<td>45.0</td>
<td></td>
</tr>
<tr>
<td>Patient post treatment</td>
<td>6.0</td>
<td>85</td>
<td>495.7</td>
<td>7.0</td>
<td>7.0</td>
<td>80.0</td>
<td></td>
</tr>
<tr>
<td>Absolute values</td>
<td>7-10</td>
<td>80-100</td>
<td>559.9</td>
<td>1-10</td>
<td>6.5-7</td>
<td>70-100</td>
<td></td>
</tr>
</tbody>
</table>
Treatment

The infected bull was treated in two phases. Phase I combination of procaine penicillin and streptomycin (Penstrep®) at a dose rate of 80000 IU/kg and 80 mg/kg respectively, dexamethasone, multivitamin injections (Vitaflash®) and sulphur ointment, were administered parenterally and topically respectively, for 5 days consecutively.

Three days after, phase II were began tetracycline long acting (Triadox®), and multivitamin injections (Vitaflash®) were administered parenterally every other day and daily consistently for 10 days and 5 days respectively. At the end of phase I treatment the bull had almost fully recovered. Thereafter, topical therapy with povidone-iodine was used. Scabs were removed by grooming under mild sedation and the lesions were dressed every other day until the lesions heal as presented in (Plate III). The papules and crust disappeared leaving few pink-greyish scars on which some regrowth hairs was noted after phase II treatment as shown on (Plate II) the scars were about to covered with hairs as presented in (Plate III) and the bull resume his primary assignment i.e. breed purpose.

Plate III. Showing some scared about to cover with hairs on the skin of the Friesian bull (1 week) post treatment

Recommendation and Conclusion
Infected animals should be isolated and treat immediately after seen the clinical signs to archive good result. Factors that bring mechanical injury to the skin should be avoided. Topical medication is significant in management of dermatophilosis. Parenterally administered antibiotics such as long acting oxytetracyclines and penicillin-streptomycin are usually effective. The control and prevention measures of Dermatophilosis are aimed at minimizing the effect of predisposing factors and early treatment of clinical cases. Humans can acquire the infection of Dermatophilosis who are exposed to infected animals. Dermatophilosis often result into economic problems by creating severe skin matting resulting in poor hide and skin quality, overall decrease in animal productivity and high number of mortality in susceptible and weak animals.

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Reference


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