Ovine Coccidiosis: A Case Report


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Ovine Coccidiosis: A Case Report


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Abstract

Parasitism in food animal is of great economic importance. Coccidiosis is one of the gastrointestinal parasites that have a high detrimental effect on the sheep industry. A two and a half year-old ram was brought from the northern part of Nigeria into the University Teaching and Research Farm, Federal University of Agriculture, Abeokuta, Nigeria on the 30th December, 2010. About two weeks later, the ram was observed passing diarrheic feces, frequently urinating (4 minutes interval) and mucopurulent nasal discharge. Clinical examination revealed fever, congested mucous membrane, slight dehydration, matted hind-quarter, respiratory distress and lethargy. Based on clinical signs, intestinal protozoan infection and peste de petits ruminants (PPR) were tentatively diagnosed. Initial management which included metronidazole oral, 20% oxytetracycline, 20% tylosin and multivitamins yielded no positive response. Laboratory results revealed presence of heavy coccidian oocyst. The combination of potentiated oral sulphonamide and parenteral sulfadimidine sodium injection proved very effective. This report shows that sheep of any age bracket can present clinical condition of coccidiosis at any season of the year if exposed to factors that favour the incidence of the disease and also that advanced cases of ovine coccidiosis may need combination therapy for effective treatment.

Keywords: Ovine, coccidiosis, therapy.
POLYTHERAPY IN OVINE COCCIDIOSIS: A CASE REPORT

Introduction

Parasitism in sheep and goats is a substantial challenge plaguing small ruminant farmers across the world. Parasitism has a high detrimental effect on the sheep industry. Gastrointestinal parasite infections, including coccidiosis are the most important limiting factor of sheep productivity (Jones, 2001). Wadhwa et al., (2011) reported high prevalence of gastrointestinal parasites in cattle and buffaloes in India.

Coccidiosis is an intestinal protozoan parasitic disease and one of the most economically important infections that affect many species of farm and domestic animals. It is a contagious enteritis caused by infection with both Eimeria and Isospora spp. and occurs in all domestic animals. The disease occurs universally but it is most important where the animal are confined or housed in small areas (Radostits et al., 2007).

Coccidial infections have been reported in almost all sheep rearing in the world. It is assumed that many of domestic ruminants become infected with coccidia during their early life (Catchpole and Taylor, 1994). This disease could occur in all breeds and ages of sheep but feedlot lambs aging 3-5 months have a high incidence, while older sheep carry the parasites and rarely develop the clinical signs of the disease (Levine, 1973; Pellerdy, 1974) and as such act as carrier.

Fifteen Eimeria species were considered to have the capability of infecting sheep (Platzer et al., 2005), fourteen species (some of which are E. ovinoidalis, E. ovina, E.ahsata, E. faurei, E. crandallis, E.parva, E. pallida, E. intricata, E. granulosa, E. punctata) were found in the intestine of the sheep and one species (E. gilruthi) in the abomasum (Reginsson and Richter, 1997). The disease can occur in adults under extreme stress or due to lack of immunity, feed changes, grazing lush or wet pastures.

Clinical signs include diarrhea (which sometimes contain blood or mucus and could be very watery), lethargy, listlessness, inappetence, fever, dehydration, wool breaking and emaciation. Untreated cases may result to death (Cynthia, 2005). Diagnosis is based on history and clinical signs, as well as microscopic faecal examination for presence of oocysts. Coccidiosis in sheep has been successfully treated with sulphadimidine, given orally or parenterally and repeated at half the initial dose level on each of the next two days. Other potent drugs include amprolium and decoquinate (Cynthia, 2005).

Prevention is based on good management; dry beddings and regular washing/cleaning of feed and water troughs. In some intensive flocks in which the disease occurs annually, low levels of amprolium or decoquinate may be included in the concentrate feed. Trade route animals are normally transported through a long stressful journey. A lot of these animals usually become moribund on arrival. This could be due the presence of some parasitic organisms whose presence did not constitute any clinical significance until the immune system of the animal become suppress due to the stress of the journey.

This case is been reported to stress the importance of prompt and proper veterinary medical attentions for all trade route animal (sheep) before embarking on the usual and stressful journey. This report also indicate the need to re-evaluate and treat appropriately (where necessary) soon after the journey.

Materials and Methods

Case History

A two and a half year-old ram was brought from the northern part of Nigeria into the University Teaching and Research Farm, Federal University of Agriculture, Abeokuta, Nigeria on December 30th, 2010 without any complaint of illness. The Farm is situated at Latitude 70 91 3911N and Longitude 30 201 5411E, 76m above sea level in the rain forest vegetation zone. The area has a humid climate with mean annual rainfall, average relative humidity and temperature of 1037 mm, 82% and 34.70C respectively (Oyekunle et al., 2010). The Ouda ram weighing 60kg was examined and found apparently healthy, with all clinical parameters within normal limits. The animal was routinely dewormed with Albendazole suspension at 5mg/kg body weight. The animal was allowed to graze with other sheep on the farm after some days of acclimatization.
About two weeks later (mid-January, 2011), the ram was reported passing diarrheic feces.

**Clinical Examination and Management**

Clinical examination revealed the following findings: rectal temperature was 40.4°C as against normal range of 38.6°C - 39.6°C, congested mucous membrane, mucopurulent nasal discharge, diarrhea, slight dehydration, matted hind-quarter and lethargy. The respiratory, pulse and the heart rates were within normal limits. Frequent urination (4 minutes interval) was observed. Tentative diagnosis of intestinal protozoan infection with a differential diagnosis of PPR and helminthosis was made based on the observed clinical presentations.

**Management**

Blood, fecal and urine samples were collected for hematology, parasitology and urinalysis. Preliminary management pending outcome of laboratory analysis was instituted as follows: Oral administration of Metronidazole suspension at 40mg/kg body weight bid daily; 20% Oxytetracycline at 20mg/kg intramuscularly; 20% Tylosin at 4mg/kg intramuscular and 4ml, multivitamins given intramuscular. No significant positive response was observed even after 48 hours post treatment. The rectal temperature was 40.1°C. The diarrhea persisted and worsened (Figure 1) with attending consequences such as weakness and further drop in appetite. The mucus membrane remained congested.

**Results and Concluding Management**

Hematology results revealed leucopenia, hypocythemia (erythropenia), hypo haemoglobin and macrocytic hypochromic anaemia (Table 1) while urinalysis result showed bilirubinuria, hypostenuria and proteinuria (Table 2). Parasitology result demonstrated the presence of coccidian oocyst (+++) and no helminth ova was seen (Figure 2).

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**Table 1:** Haematological values of the adult ram. Blood picture reveals leucopenia, erythropenia and macrocytic hypochromic anaemia.

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Result</th>
<th>Normal range</th>
</tr>
</thead>
<tbody>
<tr>
<td>PCV (%)</td>
<td>30</td>
<td>27 – 45</td>
</tr>
<tr>
<td>RBC (x10^6/ul)</td>
<td>5.1</td>
<td>9 – 15</td>
</tr>
<tr>
<td>Hb (g/dl)</td>
<td>3.9</td>
<td>9 – 15</td>
</tr>
<tr>
<td>MCV (fL)</td>
<td>58.8</td>
<td>28 – 40</td>
</tr>
<tr>
<td>MCHC (g/dl)</td>
<td>13.1</td>
<td>31 – 34</td>
</tr>
</tbody>
</table>

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Fig. 1: Hind quarters of the adult ram with peri-anal region soiled with diarrheic feces (yellow arrows). White arrow points to the anus.
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<table>
<thead>
<tr>
<th>WBC (x10^9/L)</th>
<th>2.4</th>
<th>4 – 12</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Differentials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Neutrophils (%)</td>
<td>75</td>
<td>10 – 50</td>
</tr>
<tr>
<td>Lymphocytes (%)</td>
<td>10</td>
<td>40 – 75</td>
</tr>
<tr>
<td>Monocyte (%)</td>
<td>10</td>
<td>0 – 6</td>
</tr>
<tr>
<td>Eosinophils (%)</td>
<td>5</td>
<td>0 – 10</td>
</tr>
<tr>
<td>Basophils (%)</td>
<td>0</td>
<td>0 – 3</td>
</tr>
</tbody>
</table>

**Table 2:** Results of Urinalysis test on the urine sample of the adult ram showing bilirubinuria, hypostenuria and proteinuria.

| Urobilinogen | negative |
| Glucose      | negative |
| Bilirubin    | +1       |
| Ketones      | negative |
| Specific gravity | 1.005(1.015–1.045) |
| Haematuria   | negative |
| pH           | 6.5      |
| Protein      | +1       |
| Nitrite      | negative |
| Leucocytes   | negative |

**Fig. 2:** Photomicrograph showing numerous Eimeria oocysts (+++). Magnification: x40.

Based on the laboratory results, a definitive diagnosis of coccidiosis was made and the treatment regimen was changed as indicated below:

- Sulfadimidine sodium at 100mg/kg intramuscular for three days, followed up with Zinaprim® (combination of sulphamethazine (100mg/kg) and trimethoprim (20mg/kg)) orally for 5 days; 40ml of mist Kaolin twice daily; and 4ml of multivitamin injection intramuscular for 3 days.
- Good food, plenty water and solid salt lick were supplied while movements were restricted to the pen. Forty eight hours after the second line of treatment, the health condition of the animal improved with evidence of improved appetite and well-formed feces. The temperature progressively dropped from 40.4oC to 39.7oC 24 hours post treatment and then 38.4oC 48 hours post treatment. The mucous membrane returned to normal appearance (pink) and normal well-formed feces.
were passed 72 hours after treatment. The appetite and the activity of the animal greatly improved.

Discussion

The animal in this case report is an adult sheep and the period of this incidence was dry season in Nigeria. These two factors do not favour incidence of coccidiosis in sheep (Pellergy, 1974). This implies that this animal had a subclinical coccidia infection before being transported to the University farm. The stress of the journey, the change of environment and diet must have precipitated the incidence of clinical infection in the animal. The source of stress here is the long journey the animal passed through. This is in consonance with Constable (2012) who reported that lambs 1–6 months old in lambing pens, intensive grazing areas, and feedlots are at greatest risk as a result of shipping, ration change, crowding stress and severe weather.

Coccidiosis as a protozoan disease parasitizes and destroys the lining of the intestinal epithelium. The leucopenia observed in this animal might be as a result of the persistent tissue invasion caused by the coccidia parasite, while the abnormalities such as the bilirubinuria, hypostenuria, and proteinuria seen in the urinalysis might be due to paradoxical glomerulonephritis caused by the fever observed in this animal (40.40°C). The failure of the initial treatment with metronidazole is an indication that metronidazole is not effective against coccidiosis in sheep.

On detection of the Eimeria oocyst in the fecal sample, the treatment line was changed to a potentiated sulphonamide. Along with other supportive therapies, the use of the potentiated sulphonamide proved very effective in the treatment of ovine coccidiosis.

Sulphonamides are relatively insoluble in water. They are weak organic acids with varying degree of binding to the plasma proteins. Sulphonamides are antimetabolites, acting by inhibiting the organism’s metabolic pathway that is necessary for normal production of RNA (DNA synthesis), protein synthesis and microbial replication mechanisms (Amanda, 2007). Sulphonamides competitively inhibit enzyme dihydropteroate synthase from PABA and dihydroxymethyl dihydropterine (Anand 1983). The inhibition of folate synthesis results in decreased production of nucleotides that are needed by the developing coccidial stages. Sulfonamides are most active against the asexual stages but lesser in activity against the sexual stages of coccidian.

They are often given as a potentiated sulphotamide when combined with other antimicrobial agents especially trimethoprim. Trimethoprim is a member of dihydrofolate reductase/thymidylate synthase (DHFR/TS) inhibitors. The combination was observed to produce synergistic effects due to activity at two places (phases) in folate biosynthesis. The combination will also decrease the minimum inhibitory concentration of both drugs hence reducing side effects.

The capability of rapidly diagnosing the disease and identifying its causative agent is critical to combat diseases and halt epidemics (Wadhwa et al., 2012a). Recent technological developments have led to the proliferation of new, rapid diagnostic tests that hold promise for the improved management and control of infectious diseases (Wadhwa et al., 2013; Wadhwa et al., 2014). New technologies such as microfluidics (Wadhwa et al., 2012b) and Lab-on-Chip (Liu et al., 2011) are examples of promising new technologies that can underpin development of laboratory-free diagnostic devices for these hemoparasitic infections in animal husbandry.

Conclusion/Summary

Trade route animal are susceptible to all kinds of infections owning to several immune depressing stress factors, ranging from change of location and diets, stress of long and stressful journeys and presence of potential disease causing microbial and parasitic organisms.

This report has shown that sheep, adult or lamb can present clinical condition of the disease (coccidiosis) at any season of the year if exposed to factors that favour the incidence of the disease and also that advanced cases of Coccidiosis may be need combination therapy for effective treatment.

Recommendation
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In view of the above observations, we recommend that animal’s transported over a long distance should be prophylactically treated to boost the animal’s immunity some days prior to the journey. Basic laboratory examination should be carried out on animals on arrival at the new location while been confined in the quarantine pen. This will enhance early detection of some disease and prevent unnecessary loss.

References


