SVU-IJVS-8(3), 26-36 Print ISSN: 2535-1826 Online ISSN: 2535-1877

Case Report Open Access

From Diagnosis to Recovery: A Novel Integrated Approach to Managing Ovine Coccidiosis in Assorted Breeds of Rams

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https://doi.org/ 10.21608/svu.2025.383045.1390
Submit Date: 08/05/2025; Revise Dat: 22/08/2025; Accept Date: 30/08/2025

ABSTRACT

Ovine coccidiosis, a debilitating parasitic disease caused by various species of the genus Eimeria, poses a persistent and formidable challenge in the realm of sheep husbandry. The impact of this disease is profound, resulting in substantial economic losses for farmers and significantly compromising the welfare of affected animals. This case report details an approach to tackling ovine coccidiosis across a diverse array of ram breeds. The strategy employs a combination of diagnostic techniques and therapeutic interventions, along with management practices tailored to the specific needs of different breeds. By utilizing fecal floatation technique, veterinarians were able to accurately identify the specific Eimeria species involved, ensuring that treatments were precision-targeted to effectively combat the infection. In conjunction with these diagnostics, pharmacological treatments were meticulously chosen based on their efficacy and the unique resilience of each breed, while optimized husbandry protocols further supported the health and recovery of the animals. The results of this integrated approach demonstrate a significant enhancement in disease mitigation and recovery rates of 47.75%, effectively lowering mortality rates and boosting overall productivity within the flock. This treatment strategy, which is sensitive to the breed-specific nuances, not only improves recovery outcomes but also sets a promising precedent for sustainable disease management in sheep farming. Ultimately, this methodology serves as a replicable model, offering valuable insights for broader applications within the field of veterinary medicine, with the potential for transforming the management of similar parasitic diseases across various livestock populations.

Keywords: *Ovine, Coccidiosis, Eimeria, treatment, diagnosis*

INTRODUCTION

The production of sheep around the world is seriously endangered by a parasite disease called "ovine coccidiosis." Protozoa belonging to the genus *Eimeria* are the cause of this ailment, which primarily affects young rams and lambs. Other species that can infect sheep include *Eimeria ahsata*, *Eimeria bakuensis*, *Eimeria faurei*, *Eimeria gilruthi*, *Eimeria granulosa, Eimeria intricata, Eimeria marsica, Eimeria ovina, Eimeria pallida, Eimeria parva, and Eimeria weybridgensis*, but they are generally less pathogenic, only two of the species of *Eimeria* that cause coccidiosis in sheep are pathogenic; *E. crandallis* and *E. ovinoidalis* are the two pathogenic species that afflict sheep (Bangura & Bardsley, 2020; Engidaw et al., 2015). Symptoms of ovine coccidiosis include diarrhea, decreased weight gain, and in extreme situations, death. The livestock industry suffers significant financial losses as a result of these issues (Bangoura & Bardsley, 2020).

Therefore, there is an urgent need for a more comprehensive and integrated strategy to disease control. This could include developing alternative treatments that reduce dependency on pharmacological interventions, employing immunization measures, enhancing biosecurity protocols, and putting better management techniques into practice. We can manage diseases in animal husbandry more effectively and sustainably if we tackle these issues holistically (Ahmed et al., 2024).

This case study provides a helpful approach to dealing with this problem. It highlights the importance of improved husbandry practices, targeted drug therapies, early identification, and nutritional support. By combining these components, the approach aims to improve overall health and recovery outcomes for affected rams, advance sustainable animal health management, and decrease recurrence of illness. The strategy emphasizes holistic disease control methods that minimize reliance on chemical treatments while optimizing animal comfort, which is consistent with recent advancements in veterinary parasitology (Agrawal et al., 2024).

Bedford & Apajalahti (2022) state that dietary changes like proper protein intake and mineral supplementation enhance immunological resistance against coccidial infections. The report also evaluates the effectiveness of various treatment plans that incorporate both conventional anticoccidials and natural alternatives, like probiotics and herbal extracts (Bharti et al., 2025). Additionally, the report describes the diagnostic techniques, such as fecal floatation analysis, that was used to identify *Eimeria* species that affect different ram breeds (Broom, 2021).

This case report adds to the increasing amount of data demonstrating various disease management approaches in veterinary medicine by offering a fresh, integrated approach. To lessen the effects of ovine coccidiosis in a range of ram populations, the results show the necessity of

early intervention, customized treatment plans, and sustainable husbandry techniques.

CASE REPORT:

Integrated Approach to Managing Ovine Coccidiosis in Assorted Breeds of Rams

Case History

On the 24th of February, 2025, a client reported a case of progressive diarrhea on his farm that had lasted for roughly 2 weeks to the Veterinary Teaching Hospital (VTH), University of Maiduguri, Large Animal Unit of VTH. This was a sequel to an abrupt change of feed, as was revealed during the history taken which could predispose the young rams to coccidiosis. There were 7 mortalities recorded out of over 185. The morbidity recorded was 50% in the farm.

Signalment

The species is ovine (*Ovis aries*). The breeds include Balami, Uda, and Yankasa. The rams are young in terms of age. The animals are male. The number of rams impacted was 92 out of 185. The death rate was 7, and the body weight ranged from 50 to 75 kilograms.

Clinical symptoms observed

The rams had pasted anal regions and were passing bloody, projectile diarrhea. The animals exhibited congested mucous membranes and nasal discharge. The rams were dehydrated, malnourished, and emaciated. They became recumbent, followed by death.

Fig 1: Pasted perineum with fecal matter

Vital Parameters

The affected rams had a body temperature of 39.9°C, a pulse rate of 87 beats per minute, an increased heart rate of 90 beats per minute, and a respiratory rate of 29 breaths per minute.

Diagnostic Plan

Physical examination of the herd was conducted and the following laboratory tests were carried out, full blood count and Biochemical analysis. Including parasitology for fecal analysis /Post Mortem.

Sample collected

Blood sample was aseptically collected through jugular venipuncture using sterile vacutainer tubes. Fecal sample was collected per rectum and moribund animals were presented for postmortem examination.

Post-mortem Findings

During postmortem examinations of the dead rams, the following pathological anomalies were detected, which are typically associated with coccidiosis: The gastrointestinal lesions

discovered included severe hemorrhagic enteritis with dilated intestines and the detection of *Eimeria* oocysts in intestinal scrapings. Similarly, the intestines are bloody, with patches of petechial to ecchymotic hemorrhage. The liver and kidneys exhibited modest congestion and pallor. The lymphoid organs show increased mesenteric lymph nodes. The mucosal integrity revealed necrosis and ulceration of the intestinal mucosa, particularly in the ileum and cecum. Blood results reveal that anemia is suspected as a result of hemorrhagic intestinal injury. The feed content analysis revealed the presence of undigested feed particles, indicating a diminished appetite and nutritional insufficiency. The carcass was quite fleshy, with a pasted vent and crimson flow from the anus. Frothy exudates were seen in the trachea and bronchi. The lungs had become congested and failed to collapse, leaving rib imprints. Multiple cysts were seen in the abdominal cavity.

Multiple cysts in a young ram's abdominal cavity could be caused by a variety of factors, such as parasite infections, congenital anomalies, or fluid-filled sacs linked to organ malfunction. Some possibilities include: Hydatid cysts: Caused by *Echinococcus granulosus*, a tapeworm that leads to cystic echinococcosis in livestock. These cysts can develop in the liver, lungs, or other abdominal organs (Gessese, 2020). Mesenteric cysts: Fluid-filled sacs that form within the mesentery (the tissue anchoring the intestines). They can cause abdominal pain and digestive disturbances in young rams (Bayne & Edmondson, 2020). Renal or splenic cysts: Cysts can develop in the kidneys or spleen, sometimes leading to organ dysfunction in animals (Ingle et al., 2014). Neoplastic cysts: Some cysts may be associated with tumors, either benign or malignant, especially in young ruminants (Vasconcelos et al., 2023).

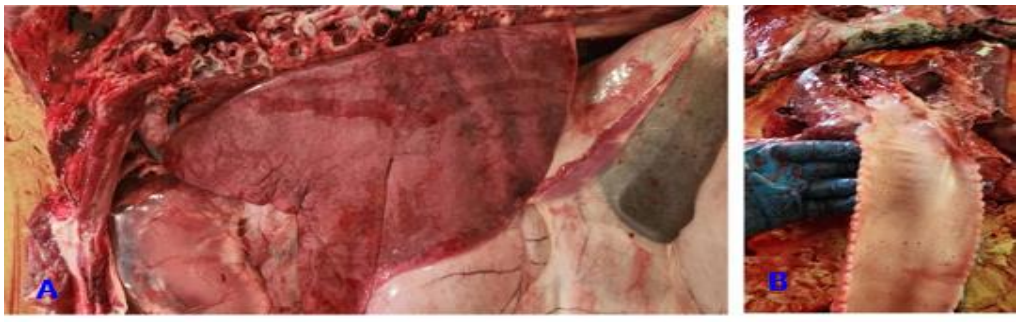

Fig. 2a: Enlarged lungs with rib imprints

Fig. 2b: Trachea with frothy exudate


Fig 3a: Blood-tinged feces from the rectum; Fig 3b: Hemorrhage in the Intestine

Fig 4a: Three fluid cysts found in the abdominal cavity

Table 1: Hematology Results

Blood Parameters	Obtained values	Normal values
Hematocrit (PCV) %	23	27–45
Red Blood Cell (RBC) × 10^6/µL	6.5	9–15
Hemoglobin (Hb) g/dL	7	9–15
White Blood Cell (WBC) × 10^3/µL	15,500	4–12
Platelet × 10^3/µL	170,000	200–800

The significant blood loss is indicated by a reduced hematocrit of 23% while, hemorrhagic injury is suggested by a red blood cell count of 6.5 million cells/µL, which is below normal. Anemia is indicated by reduced hemoglobin levels of 7 g/dL while an inflammatory response to intestinal damage is indicated by a high white blood cell count of 15,500 cells/µL, and continuous hemorrhagic loss is indicated by a platelet count of 170,000 platelets/µL, which is normal to slightly decreased.

The blood smear indicated regenerated reticulocytosis, poikilocytosis, and anisocytosis all support the diagnosis of blood loss anemia. The hematological findings show hemorrhagic anemia brought on by severe intestinal damage, which is probably made worse by an *Eimeria* infestation. Significant physiological stress is

indicated by mild hepatic and renal congestion as well as other systemic symptoms. To avoid more issues, supportive treatment is recommended, which includes hydration therapy, hematinic supplements, and drugs designed to treat coccidiosis.

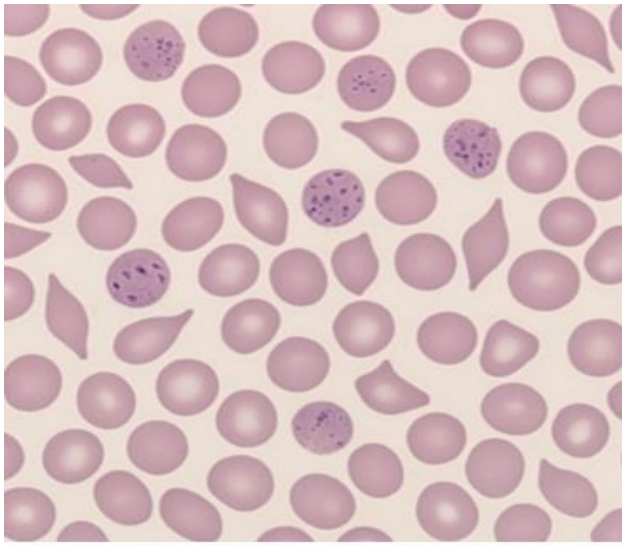

Fig 4b: The blood smear indicated regenerated reticulocytosis, poikilocytosis, and anisocytosis

Table 2: Biochemistry Results

Blood Parameters	**Obtained values**	**Normal values**
Total Protein g/dL	23	6.0–7.9
Sodium (Na^+) mmol/L	6.5	135–150
Potassium (K^+) mmol/L	7	3.5–5.5
Chloride (Cl^-) mmol/L	15,500	95–110
Bicarbonate (HCO_3^-) mmol/L	170,000	20–30

The serum biochemistry result indicated potential alterations in total protein of (4.0 g/dL) and an electrolyte balance due to fluid loss of Sodium (Na^+) of 125 mmol/L, known as hyponatremia was due to excessive fluid loss were dictated. Potassium (K^+) value was low (2.5 mmol/L) was dictated and it might be due to projectile bloody diarrhea. Chloride (Cl^-) loss of (85 mmol/L) was dictated and this is known as hypochloremia, and it was due to fluid loss. Low Bicarbonate (HCO_3^-) level of (13.5 mmol/L) was also detected and this could lead to metabolic acidosis, especially in cases of severe diarrhea. These values can vary based on factors like **age, breed, diet, and health status**. When interpreting lab results.

Parasitology Results

The result of Coccidia oocysts indicated positive (++).

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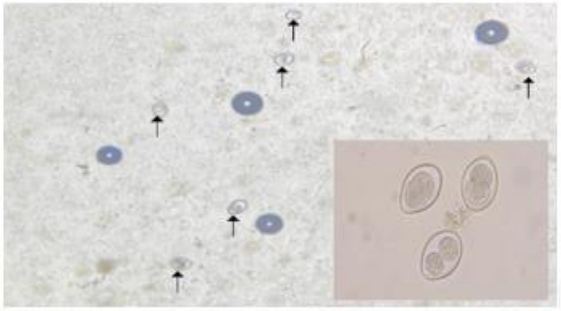

Fig 5a: showing coccidia oocysts under the microscope at X 100

Therapeutic Approach: Recent Advances in Coccidiosis Management

In light of recent advancements in the treatment of coccidiosis in sheep, the management plan employed an integrated approach that included pharmacological, nutritional, and environmental interventions:

Fig 5a: Day 4 after instituting treatment

Fig 6a & 6b: Day 5 after instituting treatment

Fig 7a & 7b: Day 8, showing recovery of the rams

Fig 8a: Day 10, Full recovery of the herd

Pharmacological Treatment

1) Anticoccidial Therapy: Intracellular *Eimeria* species were successfully eradicated by toltrazuril (20 mg/kg, single dosage), a broad-spectrum Coccidioides (de Souza Rodrigues et al., 2017; Guedes et al., 2024). Amprolium supplementation (50 mg/kg per day for five days) might interfere with parasite metabolism (Iqbal et al., 2013).

2) Antimicrobial Support: The affected rams were given oxytetracycline (20 mg/kg

Intramuscular (IM)) to prevent secondary infections.

3) Fluid and Electrolyte treatment: To address dehydration, Ringer's lactate and isotonic saline were administered orally and intravenously as fluid replacement treatment. Electrolyte supplementation with potassium chloride and glucose to maintain osmotic balance.

The justification of using oxytetracycline, a broad-spectrum antibiotic, especially in livestock management and its administration, is often based on several key factors, such as: **Presence of Mixed Infections:** Secondary bacterial infections often accompany viral or parasitic diseases, making broad-spectrum coverage beneficial. **Uncertain Pathogen Identification:** When immediate treatment is needed but specific bacterial culture results are unavailable, oxytetracycline provides coverage against Gram-positive and Gram-negative bacteria. **Respiratory and Enteric Infections:** In cases of pneumonia, enteritis, or septicemia, oxytetracycline effectively targets common bacterial pathogens like *Pasteurella spp*., *Mycoplasma spp.*, and *Escherichia coli*. **Wound or Surgical Site Infections:** Post-trauma or post-surgical infections may involve multiple bacterial species, making broad-spectrum activity beneficial. **Cost-Effectiveness and Accessibility:** In resource-limited settings, oxytetracycline offers a practical solution due to its long-acting formulations and intramuscular or intravenous administration options. However, antibiotic stewardship is critical. Unnecessary use can lead to antimicrobial resistance (AMR), making bacterial infections harder to treat in the long run. Ideally, bacterial culture and sensitivity testing should guide selection.

Nutritional Intervention

Introduction of a locally produced feed that is rich in protein and fiber and contains the following ingredients were instituted; fermented grains and probiotics (such as yeast, *Saccharomyces boulardi*) were utilized to enhance microbial balance and gut health. Supplementing with vitamins A and E promoted mucosal healing and to boost the immune system's resistance to disease; feed additives rich in antioxidants (zinc and selenium) were also added. Monensin was added to the feed at the dose rate of 50 mg per head per day for feed efficiency and weight gain in the young rams (Ahmadzadeh et al., 2018).

Environmental & Biosecurity Measures

To stop the spread of parasites and environmental contaminants, the pens were kept clean. As natural anticoccidial agents, garlic and neem were used as herbal extracts for future prevention.

Details on the dosage and administration of garlic and neem herbal extracts:

Garlic Extract Dosage & Administration

Dried Garlic Powder: 0.4 to 1.2 grams per day was used. **Administration:** Can be taken orally for antimicrobial effects.

Neem Extract Dosage & Administration

Neem Powder (Churna): ¼-½ teaspoon, twice a day. Both garlic and neem extracts have antimicrobial properties and are used for various health benefits (Adhana et al., 2023).

DISCUSSION

Sheep—especially young rams and lambs—are susceptible to "ovine coccidiosis", a parasitic disease brought on by protozoa of the genus Eimeria. Since the illness affects growth rates, feed conversion is poor, and death is high, it causes large financial losses in the current case study. The finding was similar to the findings of Bangura & Bardsley (2020). The current case report adopted traditional management approaches, and it emphasizes treatment over prevention, necessitating a more integrated approach that encompasses diagnosis, prevention, and rehabilitation. Thus, a correct diagnosis is necessary for management to be successful. Similarly, this finding was in accord with the findings of Saxena et al. (2025).

In the present case report, the clinical signs of coccidiosis include dehydration, diarrhea, often bloody, weight loss, and general weakness. These findings were similar to the research conducted by Engidaw et al. (2015) in small ruminants. Perhaps, a combination of dietary management, environmental control, and targeted treatment is needed to prevent coccidiosis in the assorted breeds of rams.

During the period of follow-up of the case report, important preventive measures were adopted, which largely consist of hygiene and biosecurity. These measures were similar to those of Saxena et al. (2025) in their research. In the present case report, the oocyst survival is decreased by routinely cleaning the pens and making sure the bedding is dry. This approach used in our study was in accord with the approach adopted by Rijpert-Duvivier et al. (2021). Similarly, proper nutrition was adopted in order to improve gut health and infection resistance, which was enhanced by supplementation of balanced diets that contain enough fiber. This approach was also in agreement with that of Sujani et al. (2023). Coccidiostats were prophylactically used in the high-risk populations; ionophores such as monensin and lasalocid aided in the management of coccidiosis and weight gain in the herd. This approach was likewise used by House et al. (2024) and Ahmadzadeh et al., (2018) in their studies.

Targeted use of anticoccidial medications is part of the treatment after diagnosis. Sulfonamides such as sulfadimethoxine, possess anti-*Eimeria* properties. Sulfonamides this was provided as an optional remedy. Oxytetracycline (20 mg/kg) was administered intramuscularly to get rid of secondary bacterial infections. Toltrazuril and Diclazuril; these medications lessen the severity of sickness by interfering with protozoal growth. Supportive therapy such as probiotics (such as yeast) and electrolyte solutions (potassium chloride and glucose) was also administered in

order to help hydrate and heal the gut of the rams by maintaining osmotic balance

CONCLUSION

For the remaining rams, a combination of environmental, dietary, and pharmaceutical therapy led to a good recovery. Early detection and a comprehensive treatment plan improved gut health, increased weight gain, and reduced mortality in those affected. In sheep farming systems, preventing future coccidiosis outbreaks requires constant monitoring and preventive measures like feed supplementation and environmental cleanliness. From early detection to recovery, an integrated approach to ovine coccidiosis control ensures better health outcomes for rams of all breeds. Productivity is increased and financial losses are decreased when preventative, targeted treatment, and rehabilitation strategies are combined. To improve disease control, future research should focus on developing vaccines and genetic resistance.

Acknowledgments

The authors really appreciate the immense contribution of Dr. Ismaila Alhaji Mairiga of the Department of Veterinary Medicine, Faculty of Veterinary Medicine, University of Maiduguri, for proofreading and improving the quality of the manuscript in many respects thereby making it an invaluable book chapter.

Conflict of Interest

The authors declare no conflict of interest.

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