FUDMA Journal of Sciences (FJS)
ISSN online: 2616-1370
ISSN print: 2645 - 2944
Vol. 10 No. 22, November, 2026, pp 296 – 301
DOI: https://doi.org/10.33003/fjs-2026-1022-6408

Clinical and Therapeutic Management of Concurrent Feed Impaction, Helminthosis and Anaplasmosis in a Four-Year-Old Balami Ewe: A Case Report

***[1]Ada Gabriel, [2]Sani Aminatu Abubakar, [3]Ogbuagu Ngozi Ejum and [4]Hyeladzira Yusuf Bwala**

[1]Department of Veterinary Pharmacology and Toxicology, College of Veterinary Medicine, Federal University of Agriculture Zuru, Kebbi State, Nigeria.
[2]Department of Veterinary Pharmacology and Toxicology, Faculty of Veterinary Medicine, Usmanu Danfodiyo University, Sokoto State, Nigeria.
[3]Department of Veterinary Pharmacology and Toxicology, Faculty of Veterinary Medicine, Ahmadu Bello University, Zaria, Kaduna State, Nigeria.
[4]Department of Chemistry, College of Science, Federal University of Agriculture Zuru, Kebbi State, Nigeria.

*Corresponding authors' email: agabriel.vet@fuaz.edu.ng Phone: +2348073844642
ORCID: https://orcid.org/0000-0002-2709-1104

ABSTRACT
Feed impaction and parasitic diseases in small ruminant can negatively affect the health and productivity of sheep and may occur concurrently, complicating clinical management. This case report describes the clinical and therapeutic management of feed impaction, helminthosis and anaplasmosis in a 4-year-old Balami ewe presented with clinical signs suggestive of gastrointestinal obstruction and systemic parasitic disease. These conditions may arise from bacterial, viral, protozoal, and parasitic infections, as well as nutritional imbalances and inappropriate feeding practices. Common gastrointestinal disorders in small ruminants include enteritis, gastroenteritis, diarrhoea, and enterotoxaemia. Gastrointestinal parasites, particularly helminths and protozoa, are also important causes of morbidity, reduced productivity, and mortality (Okwuonu, *et al.,* 2026). Among the most significant gastrointestinal parasites are *Haemonchus contortus*, *Trichostrongylus* species, *Teladorsagia* species, *Strongyloides* species, *Eimeria* species, and *Fasciola* species. The prevalence and severity of these infections are influenced by several factors, including climatic conditions, pasture contamination, stocking density, animal age, nutritional status, and husbandry practices. Clinical examination was complemented by haematological and parasitological investigations in clinical pathology and parasitology laboratory. A blood sample was collected from the jugular vein for complete blood count and haemoparasite screening, while faecal analysis was conducted to determine helminth eggs and coccidian oocysts. Haematological findings revealed anaemia, with a packed cell volume of 19%, leukocytosis (18.1 x 10^9/L), marked lymphocytosis (14.5 x 10^9/L), and mild hyperproteinaemia (8.4 g/dL). The findings were considered consistent with an underlying infectious and parasitic disease process, with the anaemia potentially associated with anaplasmosis and helminthosis. Therapeutic management included appropriate surgical intervention for feed impaction, antimicrobial therapy, analgesic and anti-inflammatory treatment, anthelmintic therapy with albendazole, multivitamin supplementation, and intravenous fluid support. The combined diagnostic and therapeutic approach resulted in complete clinical improvement and supported recovery of the ewe. This case highlights the importance of comprehensive clinical assessment, laboratory investigation and integrated chemotherapeutic management in sheep presenting with concurrent gastrointestinal and parasitic disorders.

Received: 25 Sept. 2026
Accepted: 29 Oct. 2026
Published: 03 Nov. 2026

Keywords: Helminthosis, Anaplasmosis, stomach, Ewe, Dehydration and Impaction.

INTRODUCTION

Gastrointestinal diseases are among the major health challenges facing sheep and goats' production worldwide (Ranjha., Rani, and Zaheer, 2026). Feed impaction is a gastrointestinal clinical condition involving the accumulation and compaction of ingested feed within the rumen complex or other parts of the gastrointestinal tract, resulting in impaired passage of ingesta and disruption of normal digestive function (Oyenekan *et al.,* 2024). It may occur in sheep following the ingestion of excessive quantities of course, dry, or poorly digestible feed, inadequate water intake, sudden dietary changes, or poor feeding management. However, sheep and goat production and husbandry face numerous challenges, including both infectious and non-infectious diseases, which can adversely affect animal health and productivity (Underwood *et al*., 2015). In affected animals, impaired gastrointestinal motility and distension may lead to reduced appetite, abdominal discomfort, decreased faecal output, ruminal distension, dehydration, weakness, and, in severe cases, systemic compromise (Mekuanint, *et al.,* 2017). Despite the recognised importance of gastrointestinal diseases and parasitic infections in small ruminants, the occurrence and combined effects of concurrent infections may be underestimated in most production systems because of limited diagnostic capacity and inadequate surveillance. A better wholistic understanding of these

conditions is necessary to improve clinical management, reduce production losses, and strengthen preventive healthcare programmes in small ruminant. Therefore, investigating concurrent gastrointestinal and parasitic diseases in small ruminants is important for identifying the associated disease agents, characterising their clinical and pathological effects, determining relevant risk factors, and developing effective control measures. Such investigations can provide valuable information for veterinarians, livestock farmers, researchers, and policymakers working to improve animal health, welfare, and productivity in a Balami ewe and other small ruminant

MATERIALS AND METHODS

History and Observations

A 4-year-old Balami ewe weighing 20/kg was presented to the Large Animal Clinic, Ahmadu Bello University Veterinary Teaching Hospital, Zaria with the history of reduced feed intake and progressive weakness for 3 days prior to presentation. Further history revealed that the ewe was maintained under a semi-intensive management system, in which it had access to both housing and a designated feeding area. The animal was primarily fed a concentrate-based ration consisting of maize and soybean bran. The owner reported that the ewe had been receiving this feed prior to the onset of the clinical signs. The feeding history was considered relevant because diets containing substantial amounts of concentrate, particularly when associated with inadequate roughage or insufficient water intake, may predispose small ruminants to disturbances of normal ruminal function and feed accumulation.

Case Management

A thorough clinical examination was conducted to assess the general health status of the ewe and identify abnormalities associated with the presenting complaints. Relevant biological samples were subsequently collected and submitted to the appropriate diagnostic laboratories for haematological, haemoparasitological, and parasitological investigations. The case was managed based on the clinical findings and laboratory results.

Work Plan

i. Conduct thorough physical examination.
ii. Collect relevant samples and send to appropriate laboratories.
iii. Manage the case accordingly.

RESULTS AND DISCUSSION

Table 1: Examination: Vital Parameters

Parameters	Patient's Values	Reference Values
Respiratory rate (cycles/min)	68	20 – 30
Pulse (beats/min)	112	70 – 90
Temperature (°C)	38.6	38 – 40

Reference values from 'An Introduction to Veterinary Practice', A. Z. Hassan & F. B. Hassan, 2003 (ABU Press)

Clinical Findings

i. Tachypnoea
ii. Tachycardia
iii. Congested ocular mucous membrane
iv. Moderate Dehydration
v. Rough hair coat
vi. Epilation
vii. Poor body condition
viii. Hard mass felt on palpation of left flank

Differential Diagnoses

i. Foreign body rumen impaction
ii. Helminthosis

Tentative Diagnosis

i. Foreign body rumen impaction
ii. Helminthosis
iii. Clinical Pathology

Diagnostic Investigations: Samples Collected

A blood sample was aseptically collected from the jugular vein using a sterile syringe and needle and subjected to haematological analysis to evaluate the general health status of the ewe and determine its suitability for surgical intervention e. i rumenotomy, if required. The case involved the management of feed impaction, helminthosis, and anaplasmosis, with appropriate therapeutic interventions instituted according to the clinical condition of the animal. A portion of the whole blood sample is also submitted to the Protozoology Laboratory to determine whether the ewe is infected with blood-dwelling parasites (haemoparasites). These organisms may occur within red blood cells or in the bloodstream and can cause anaemia, weakness, fever, jaundice, weight loss, or other clinical abnormalities that endanger the life of the life animal.

Table 2: Laboratory Results

Parameters	Patient's values	Reference values
PCV (%)	19	24-45
TWBC ($X10^9$/L)	18.1	4-12
Band Cells ($X10^9$/L)	0.3	0-0.3
Neutrophils ($X10^9$/L)	3.3	0.7-6.0
Lymphocytes ($X10^9$/L)	14.5	2.0-9.0
Monocytes ($X10^9$/L)	0	0-0.8
Eosinophils ($X10^9$/L)	0	0-1.0
Basophils	0	0-0.2
Total Proteins (g/dl)	8.4	6.0-7.9

The Clinical Pathology laboratory result (Table 2), indicates, the PCV of 19% is below the reference range of 24-45%, indicating anaemia. This finding is clinically important in relation to the suspected anaplasmosis and helminthosis. Anaplasma organisms invade the red blood cells and multiply within them (Archanna, *et al.,* 2025). Infected erythrocytes are subsequently removed predominantly by macrophages in the spleen and other reticuloendothelial tissues (Pruneau *et al.,* 2024). This extravascular destruction of erythrocytes produces progressive anaemia. In removal of infected erythrocytes from blood circulation, leading to a decrease in PCV. In a similarly manner, gastrointestinal helminths, particularly blood-feeding parasites, can contribute to anaemia through chronic blood loss. Therefore, the reduced PCV may reflect the combined effects of haemoparasitic disease and gastrointestinal parasitism. The anaemia may also contribute to weakness, reduced activity and poor physiological tolerance of disease or surgical stress. Total white blood cell count of ewe is 18.1 x10^9/L The TWBC of 18.1 x10^9/L which is above the reference range of 4-12 x10^9/L, indicating leukocytosis. This leukocytosis generally reflects an inflammatory, infectious, or physiological response. This may be associated with the underlying haemoparasitic infection and the inflammatory reaction associated with feed impaction and gastrointestinal disturbance. The lymphocyte count was 14.5 x 10^9/L, which was considerably higher than the reference range of 2.0-9.0 x 10^9/L, indicating prominent lymphocytosis and representing the most notable leukocyte abnormality observed in the haematological profile. Lymphocytosis may occur in response to persistent antigenic stimulation, infectious diseases, and some chronic inflammatory conditions. In this case, it may reflect an immune response to the underlying infectious or parasitic conditions. Because the increase in TWBC is largely attributable to the lymphocyte count rather than neutrophils, the leukocytosis should not be described simply as a neutrophilic inflammatory leukocytosis. Neutrophil count was 3.3 x10^9/L, it falls within the stated reference range. Although the animal was undergoing disease and subsequently surgical management, there was no neutrophilia based on these reference values. The band-cell count of 0.3 x10^9/L is at the upper limit of the reference range, but by itself does not establish a significant left shift. Eosinophils: 0 x10^9/L The eosinophil count was 0 x10^9/L, which is still within the stated reference range. Although, eosinophilia can occur with some helminth infections, its absence does not exclude helminthosis. The diagnosis of helminth infection should therefore be based primarily on faecal examination and other clinical findings rather than on eosinophil count alone. The total protein concentration of 8.4 g/dL is mildly elevated above the reference range of 6.0-7.9 g/dL. Hyperproteinaemia may occur with dehydration, because of reduction in plasma volume or water increases the relative concentration of plasma proteins. It can also occur with chronic antigenic stimulation and increased globulin concentrations associated with infectious or inflammatory reactions. In this case, the elevated total protein, together with leukocytosis and lymphocytosis, may be consistent with an ongoing inflammatory or infectious process of anaplasmosis. However, albumin and globulin concentrations would be required to determine whether the increased total protein is primarily due to dehydration or hyperglobulinaemia. In conclusion, the laboratory results indicate moderate-to-severe anaemia (PCV 19%), leukocytosis (TWBC 18.1 x10^9/L), marked lymphocytosis (14.5 x10^9/L), and mild hyperproteinaemia (8.4 g/dL). The anaemia could be associated with the reported anaplasmosis and or helminthosis, while the leukocytosis and lymphocytosis suggest an active immune or inflammatory response. The elevated total protein may reflect dehydration associated with the animal's gastrointestinal disorder and or increased globulin production associated with chronic antigenic stimulation.

Laboratory Results

i. Protozoology: Anaplasma ovis seen
ii. Helminthology: Strongyle egg+

Confirmatory Diagnoses

i. Feed impaction
ii. Helminthosis
iii. Anaplasmosis

Sequential Stages of the Surgical Procedure

This illustrates the sequential stages of the surgical procedure carried out on ewe at the surgical table in the theatre.

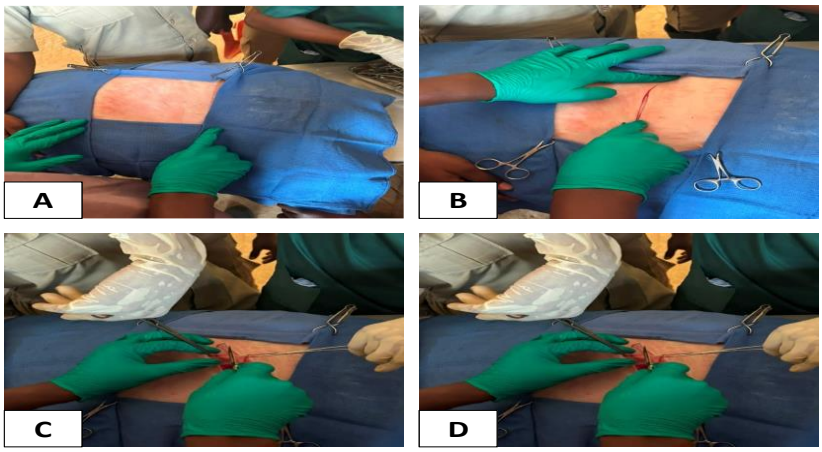


Figure 1: Panel A shows preparation and sterile draping of the surgical site. Panel B shows the initial surgical incision through the prepared skin using scalpels. Panel C demonstrates exposure and manipulation of the underlying tissue using surgical instruments and scalpel. Panel D shows the continuation of tissue dissection and surgical manipulation at the operative site. The figure explains the continuation of a surgical procedure involving tissue exposure, removal, and collection of reduction rumen content

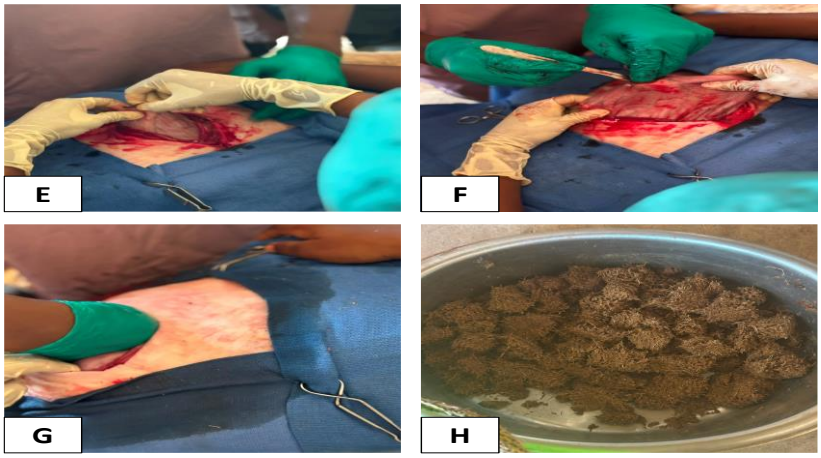


Figure2: Panel E: The surgical site is opened and the underlying tissue is exposed and carefully separated using surgical instruments. Panel F: The exposed tissue is further dissected and manipulated, with the surgical team removing the targeted tissue from the operative site. Panel G: The operative site is cleaned and assessed. Panel H: The excised rumen content is collected and placed in a sterile container for subsequent examination.

The figure explains the continuation of a surgical procedure involving tissue exposure, removal, and collection of reduction rumen content

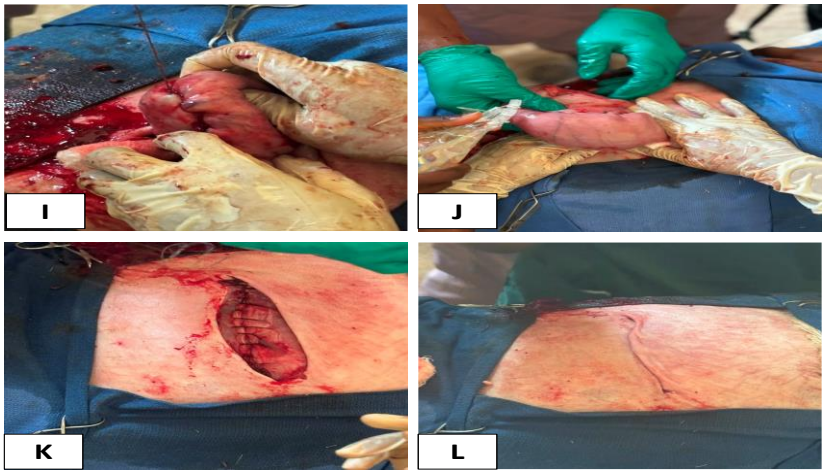


Figure 3 (I) Suturing of excise rumen (E) Suturing of underling tissues (F) dissection and removal of the targeted tissue, (G) inspection of the surgical site following excision, and (H) collection of excised tissue specimens for subsequent analysis.

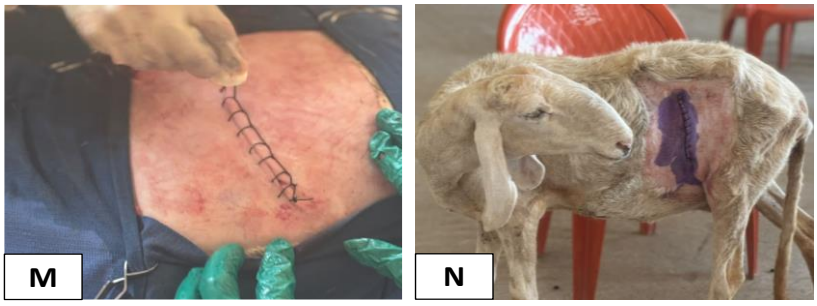


Figure4: (**M**) Final suturing of skin and (**N**) Ewe fully recovered from anaesthesia

Post-Surgical Chemotherapeutic Management of Feed Impaction, Helminthosis, and Anaplasmosis in the Ewe

The long-acting oxytetracycline 20 mg/kg (400 mg), IM

Once was administered intramuscularly to provide antibacterial cover following surgery and anaplasmosis. Surgical intervention can increase the risk of bacterial contamination and subsequent wound or systemic infection (Vanderstappen, *et al*., 2026). A long-acting preparation is designed to maintain effective antimicrobial therapeutics concentrations for an extended period, thereby providing prolonged therapeutic coverage and minimizing the frequency of administration. Long-acting oxytetracycline

(LA oxytetracycline) is a broad-spectrum antibiotic belonging to the tetracycline class (Ezeibe, Akpan, and Unigwe, 2024). Oxytetracycline is a broad-spectrum tetracycline antibiotic that inhibits bacterial protein synthesis. Pharmacokinetically, after administration, it is absorbed and distributed through the bloodstream to various tissues, where it enters susceptible bacterial cells and binds reversibly to the 30S ribosomal subunit. This binding prevents aminoacyl-transfer RNA (aminoacyl-tRNA) from attaching to the ribosome, thereby interfering with the incorporation of amino acids into growing polypeptide chains and inhibiting the synthesis of essential bacterial proteins. Long-acting oxytetracycline are oil based formulations that are designed to maintain therapeutic drug concentrations in the body for an extended period through prolonged absorption and drug release, depending on the formulation. This sustained exposure helps inhibit bacterial growth and multiplication over a longer duration, potentially reducing the frequency of administration. Oxytetracycline is primarily bacteriostatic, meaning that it inhibits bacterial growth rather than directly killing bacteria under typical therapeutic conditions. Its duration of action depends on the formulation,

Inj. Piroxicam - 0.4 mg/kg x 20 kg = 8 mg IM
Once is a non-steroidal anti-inflammatory drug (NSAID) used to control postoperative pain and inflammation. It acts primarily by inhibiting cyclooxygenase enzymes, thereby reducing the production of prostaglandins involved in pain, inflammation, and fever. This administration after surgery helps improve postoperative comfort and reduce inflammatory responses associated with tissue manipulation and surgical trauma.

Albendazole - 7.5 mg/kg, x 20 kg (150 mg), PO
Once is a broad-spectrum anthelmintic used for the treatment of gastrointestinal helminth infections. It interferes with parasite microtubule formation and glucose utilisation, ultimately leading helminth paralysis and parasite death. In this case, its use is consistent with the management of helminthosis, particularly where faecal examination or clinical assessment indicates gastrointestinal parasitism.

Inj. Multivitamins - 1 mL/10 kg a (20 kg) animal (2 mL), IM
Once the multivitamin preparation was administered as supportive therapy during postoperative recovery. Vitamins are important for normal metabolism, immune function, tissue repair, and maintenance of physiological functions. The multivitamin administration for support recovery following surgery, particularly in an animal experiencing nutritional stress or concurrent parasitic disease. The specific vitamins contained in the preparation should ideally be stated in the case report.

The 5% Dextrose, 500 mL, IV
As an Intra-surgical fluid. The 5% dextrose solution was administered intravenously as fluid and energy support during the surgical period. Intravenous fluid therapy can help maintain circulating volume and physiological stability during anaesthesia and surgery. Dextrose also provides a readily available source of energy to the animal. This 5% dextrose is not only considered a primary volume-resuscitation fluid, so its indication to maintain the animal's clinical status and blood-glucose and energy requirements.

Conclusion
The chemotherapeutic management of feed impaction, helminthosis, and anaplasmosis in a 4-year-old Balami ewe involved an integrated approach comprising clinical assessment, laboratory investigations, appropriate therapeutic interventions, and supportive care. The treatment regimen included long-acting oxytetracycline at 20 mg/kg (400 mg), administered intramuscularly (IM); piroxicam at 0.4 mg/kg (8 mg), administered intramuscularly; albendazole at 7.5 mg/kg (150 mg), administered orally (PO); and 500 mL of 5% dextrose solution administered intravenously (IV) as an intraoperative fluid. Haematological findings, particularly the reduced packed cell volume (PCV), leukocytosis, and marked lymphocytosis, provided useful information regarding the ewe's clinical condition, while parasitological investigations supported the identification of concurrent parasitic infections. The combination of antimicrobial treatment with long-acting oxytetracycline, anthelmintic therapy with albendazole, analgesia, multivitamin supplementation, fluid therapy, and appropriate postoperative care contributed to the animal's recovery. This case highlights the importance of early diagnosis, appropriate therapeutic intervention, and comprehensive clinical management of concurrent gastrointestinal and haemoparasitic conditions in sheep to improve treatment outcomes and restore animal health and productivity.

Recommendations

i. Early clinical assessment of the ewe presenting with anorexia, abdominal distension, reduced faecal output, weakness, or other signs suggestive of gastrointestinal obstruction should undergo prompt clinical examination to facilitate early diagnosis and intervention.
ii. Regular faecal examination should be encouraged to detect gastrointestinal helminths and coccidian infections, particularly in sheep managed under conditions that predispose them to parasitic infestation.
iii. Periodic screening for haemoparasites should be incorporated into flock routing health programmes, especially where anaplasmosis and other tick-borne diseases are prevalent.
iv. Preventive and control strategic and evidence-based use of anthelmintics, together with appropriate pasture and environmental management, should be adopted to reduce the burden of gastrointestinal parasitism and minimise the development of anthelmintic resistance.
v. Improved nutritional management and feeding practices and adequate access to clean water should be maintained to reduce the risk of feed impaction and other gastrointestinal disorders.
vi. Postoperative monitoring of animals undergoing surgical intervention should receive appropriate postoperative monitoring, including assessment of wound healing, appetite, hydration, faecal output, pain, and general clinical status.
vii. Integrated disease management of where multiple conditions occur concurrently, treatment should address each identified condition while providing appropriate supportive care. Therapeutic decisions should be based on clinical findings, laboratory results, drug safety, and veterinary professional judgement.
viii. Farmer education and ewe handlers should be educated on early recognition of gastrointestinal and parasitic diseases, appropriate husbandry practices, and the importance of seeking veterinary

assistance rather than relying solely on empirical treatment.

ix. Further investigation and additional studies are recommended to document the prevalence, risk factors, diagnostic characteristics, and treatment outcomes of concurrent feed impaction, helminthosis, and anaplasmosis in indigenous Nigerian sheep breeds, including Balami sheep.

REFERENCES

Archanna, H., Prabhavathy, N., Premalatha, K., Senthilkumar, K., Kavitha, S., and Vijayakumar, G. (2025). Therapeutic management of anaplasmosis in a kid. *Indian Journal of Veterinary Medicine, 45*(2), 48-50.

Ezeibe, F. I., Akpan, C., and Unigwe, C. R. (2024). Oxytetracycline long acting: A review. *Acta Scientific Pharmaceutical Sciences*, 71-77. https://doi.org/10.31080/asps.2024.08.1043

Mekuanint, S., Alemneh, T., Tse, T., and Asredie, G. (2017). Indigestible rumen foreign bodies: Causes of rumen impaction in cattle, sheep and goats slaughtered at Addis Ababa Abattoir Enterprise, Ethiopia. *Journal of Veterinary Medicine and Animal Health, 9*(8), 239-245.

Okwuonu, E. S., Onuegbu, E. U., Obi, O. J., Nnachi, I. A., Nnaji, F. N., Elijah, E. N., Ikele, C., Chime, B., Umennadi, O., and Nwankwocha, C. P. (2026). Prevalence and diversity of protozoan and helminth parasites in broilers sold at Ikpa Market, Nsukka, Enugu State, Nigeria. *In Biological Science: Research Developments and Innovations* (Vol. 1, pp. 35-51). https://doi.org/10.9734/bpi/bsrdi/v1/7724

Oyenekan, I. O., Kilani, M. A., Makinde, O. A., and Koleoso, S. A. (2024). Surgical management of rumen impaction in a four-year-old Uda ewe. *Savannah Veterinary Journal, 7*(1), 32-37.

Pruneau, L., Moumene, A., Meyer, D. F., Marcelino, I., Lefrançois, T., and Vachiéry, N. (2014). Understanding Anaplasmataceae pathogenesis using "omics" approaches. *Frontiers in Cellular and Infection Microbiology, 4*, Article 86. https://doi.org/10.3389/fcimb.2014.00086

Ranjha, M. A., Rani, S., and Zaheer, R. (2026). Gastrointestinal parasites of sheep and goat and their control. *WebLog Journal of Hematology*. https://doi.org/10.5281/zenodo.18390127

Underwood, W. J., Blauwiekel, R., Delano, M. L., Gillesby, R., Mischler, S. A. and Schoell, A. (2015). Biology and Diseases of Ruminants (Sheep, Goats, and Cattle). Laboratory Animal Medicine. 623–694. https://doi.org/10.1016/B978-0-12-409527-4.00015-8

Vanderstappen, J., Heerwegh, S., De Schepper, J., Vundelinckx, B., Saegeman, V., Bulterys, K., and Zachee, B. (2026). Bacterial contamination of the surgical field during major orthopaedic procedures: Is this a cause for concern? *Journal of Hospital Infection, 173*, 188-193. https://doi.org/10.1016/j.jhin.2026.05.005

©2026 This is an Open Access article distributed under the terms of the Creative Commons Attribution 4.0 International license viewed via https://creativecommons.org/licenses/by/4.0/ which permits unrestricted use, distribution, and reproduction in any medium, provided the original work is cited appropriately.