

Case Report

Rumen Impaction with Polythene Bag in an Adult Balami Ram: A Case Report

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ABSTRACT

Introduction: Rumen impaction in ruminants constitutes one of the numerous factors that can lead to losses in livestock if not appropriately addressed. The present study aimed to diagnose and resolve a case of rumen impaction in an adult ram.

Case report: A 3-year-old Balami ram weighing 40.4 kilograms was presented to the veterinary teaching hospital, University of Jos, Nigeria, with a one-week history of coughing and severe inspiratory dyspnea. Clinical examination revealed rectal temperature (40.7 °C), tachycardia (120 beats/min), tachypnea, congested ocular mucous membranes, bruxism due to pain, rough hair coat, absent rumen motility, and a firm palpable mass was felt in the rumen following palpation of the left abdominal wall. Hematological parameters were evaluated upon arrival at the veterinary hospital and were within normal reference values. Based on the clinical findings, a diagnosis of rumen impaction with suspected indigestible foreign material was made. An emergency left-flank rumenotomy was performed following intravenous sedation with 4 mg xylazine at 0.1 mg/kg and local anesthesia with local infiltration of 80 mg lidocaine at 2 mg/kg. A large compacted polythene bag weighing 3.1 kilograms was carefully removed after exteriorization of the rumen, followed by thorough lavage with normal saline. The rumen was closed with a Cushing suture pattern and returned to the abdominal cavity. The peritoneum and musculature, subcutaneous tissues, and the skin were routinely closed. Postoperative management included 4 mL of amoxicillin, 1.6 mL of diclofenac, and wound dressing. The ram recovered uneventfully without complications, and sutures were removed on postoperative day 15. Normal appetite, rumination, and respiratory pattern were restored by day 3 post-surgery.

Conclusion: A successful outcome was achieved through rumenotomy. The present study highlighted polythene-induced rumen impaction as an emerging and potentially life-threatening condition in small ruminants living in urban and rural areas of developing countries, where the careless disposal of plastic waste increased the risk of ingestion.

1. Introduction

Rumen impaction is a condition in ruminants, such as cattle, sheep, and goats, where the rumen becomes obstructed or overloaded with indigestible or poorly digestible material¹. Rumen impaction impairs normal rumen function, leading to digestive and systemic complications. The accumulation of such indigestible materials in the rumen can lead to severe mechanical obstruction, disrupting normal digestive

processes and causing a cascade of secondary complications². One of the most critical factors is the pressure exerted by the impacted rumen on the diaphragm, which can significantly compromise respiratory function and result in dyspnea, a condition characterized by labored breathing and considerable distress³. Rumen impaction is particularly prevalent in developing countries where plastic pollution is

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widespread, and grazing animals are at higher risk of ingesting foreign materials². The pathophysiology of rumen impaction involves gastrointestinal dysfunction and systemic effects. These systemic effects occur because the physical pressure from the impacted mass can damage nearby organs, such as the diaphragm and thoracic cavity^{2,3}. Across studies, impaction prevalence ranged from 14% to 60%. The highest occurrences were observed in sheep and goats (up to 59%) and among animals with poor body condition, females, or those grazing in proximity to urban waste areas². Rumenotomy is a surgical procedure that can often be carried out to manage cases of rumen impaction⁴. This procedure (rumenotomy) involves opening the rumen under aseptic conditions to remove any foreign material present. Rumen impaction in ruminants can become life-threatening when left untreated⁴. The present study aimed to describe the clinical presentation, diagnosis, and successful surgical management of rumen impaction caused by a polythene bag in an adult Balami ram in Jos, Plateau State, Nigeria.

2. Case report

2.1. History

A 3-year-old Balami ram from a flock of 3, weighing 40.4 kg, was presented to the Large Animal Clinic of the Veterinary Teaching Hospital, University of Jos, Plateau State, Nigeria, in August 28, 2025. The ram was presented with major complaints of coughing and difficulty breathing (Figure 1A). History revealed that the condition was noted about a week before presentation, and the flock was managed under a semi-intensive management system. The whole study lasted for three weeks. Client consent was obtained before collecting information about the case's history and performing the surgery.

2.2. Clinical findings

During the physical examination, the ram vital signs, including temperature (40.7°C), pulse (120 beats per minute), and rapid respiratory rate, were documented, all of which exceeded the established reference ranges^{5,6}. Additionally, the ram was noted to have mildly congested mucous membranes, bruxism, and a coarse hair coat. Additionally, a firm palpable mass was felt in the rumen following palpation of the left abdomen. Blood sample (4 mL) was collected from the jugular vein, and the hematological parameters, including complete blood count (CBC) with differential, including packed cell volume (PCV, %), total white blood cell count (WBC, $10^3/\mu\text{L}$), segmented neutrophils, band neutrophils, lymphocytes, monocytes, eosinophils, and basophils, were all within the normal hematology reference values⁷. The case was diagnosed as rumen impaction due to ingestion of a foreign body, based on the case history and clinical findings.

2.3. Preoperative preparations and anesthesia

Preoperatively, the proposed surgical site was prepared aseptically, and the ram was kept in the right lateral position with the proposed surgical site uppermost (Figure 1B). The

ram was sedated via intravenous administration of 4 mg xylazine (Xylased® Biaveta, Czech Republic) at a dosage of 0.1 mg/kg. Subsequently, local infiltration was performed in the left paralumbar region utilizing 80 mg of lidocaine hydrochloride (Pharma X India Pvt. Ltd., Mumbai, India) at 2 mg/kg^{8,9}, using the inverted L technique to desensitize the aseptically prepared surgical site and alleviate pain during the surgical procedure¹⁰.

2.4. Surgical procedure and treatment

Rumenotomy was performed according to the method described by Martin et al.¹¹. After securing the animal with appropriate physical and chemical restraints on the surgical table, a laparotomy cover was applied over the surgical site prior to the procedure (Figure 1C). A 3 cm longitudinal incision was made on the mid left lateral flank to reveal the subcutaneous tissue. A blunt dissection was then performed on the abdominal muscles until the peritoneum was reached. An incision was then made on the peritoneum, allowing access to the abdominal viscera. The rumen was then located and carefully exteriorized (Figure 1D). Two stay sutures using size 2 silk (Anhui Kangning Ind. Company, Ltd., Tiangchang, Anhui, China) were applied at the anterior and posterior ends of the dorsal wall of the rumen to hold the rumen in place at the surgical site. Afterward, a 3-cm incision was made in the less-vascularized area between the stay sutures to access the rumen contents. Upon rumen exploration, a large foreign body (mass) was encountered and was carefully removed from the rumen (Figure 1E and 1H). The ruminal incision site and abdominal viscera were then lavaged with normal saline to clear the debris. The rumen was closed using double rolls of Cushing suture pattern with size 2 chromic catgut (Agarycryl® Huaian Angel Med. Ins. Company, Ltd, Jiangsu, China) and carefully replaced into the abdominal cavity. The peritoneum and abdominal muscles, including the rectus abdominis, transversus abdominis, internal and external oblique muscles, were sutured together (Figure 1F) using a continuous suture pattern with size 2 Polyglactin 910 sutures (Agarycryl® Huaian Angel Med. Ins. Company, Ltd, Jiangsu, China). The subcutaneous tissue was closed with a size 2 polyglactin 910 suture in a subcuticular pattern. Subsequently, the skin was closed with a size 2 silk suture in a horizontal pattern using interrupted horizontal mattress stitches (Figure 1G).

2.5. Post-operative follow-up and result

After the surgery, the ram was administered systemic antibiotics to prevent secondary bacterial infection. A total of 4 mL of amoxicillin (five-Amox. 20% LA, Central Vet. Med. Joint Stock Company, Hanoi, Vietnam) at 20 mg/kg, was administered intramuscularly (IM) and repeated after 48 hours. Additionally, 1.6 mL of diclofenac (Jiangxi Kangtai Pharmaceutical Company, Ltd., Pingxiang, Jiangxi, China) at 1 mg/kg was administered IM for three consecutive days^{8,11}. On the third postoperative day, the surgical wound was re-evaluated and dressed with povidone iodine solution (Wokadine®, Navketan Research & Laboratories Pvt. Ltd., Mumbai, India)¹². During the postoperative follow-up on day 15, the wound had healed, the skin sutures had been removed, and the ram was discharged in normal health (Figure 1I).

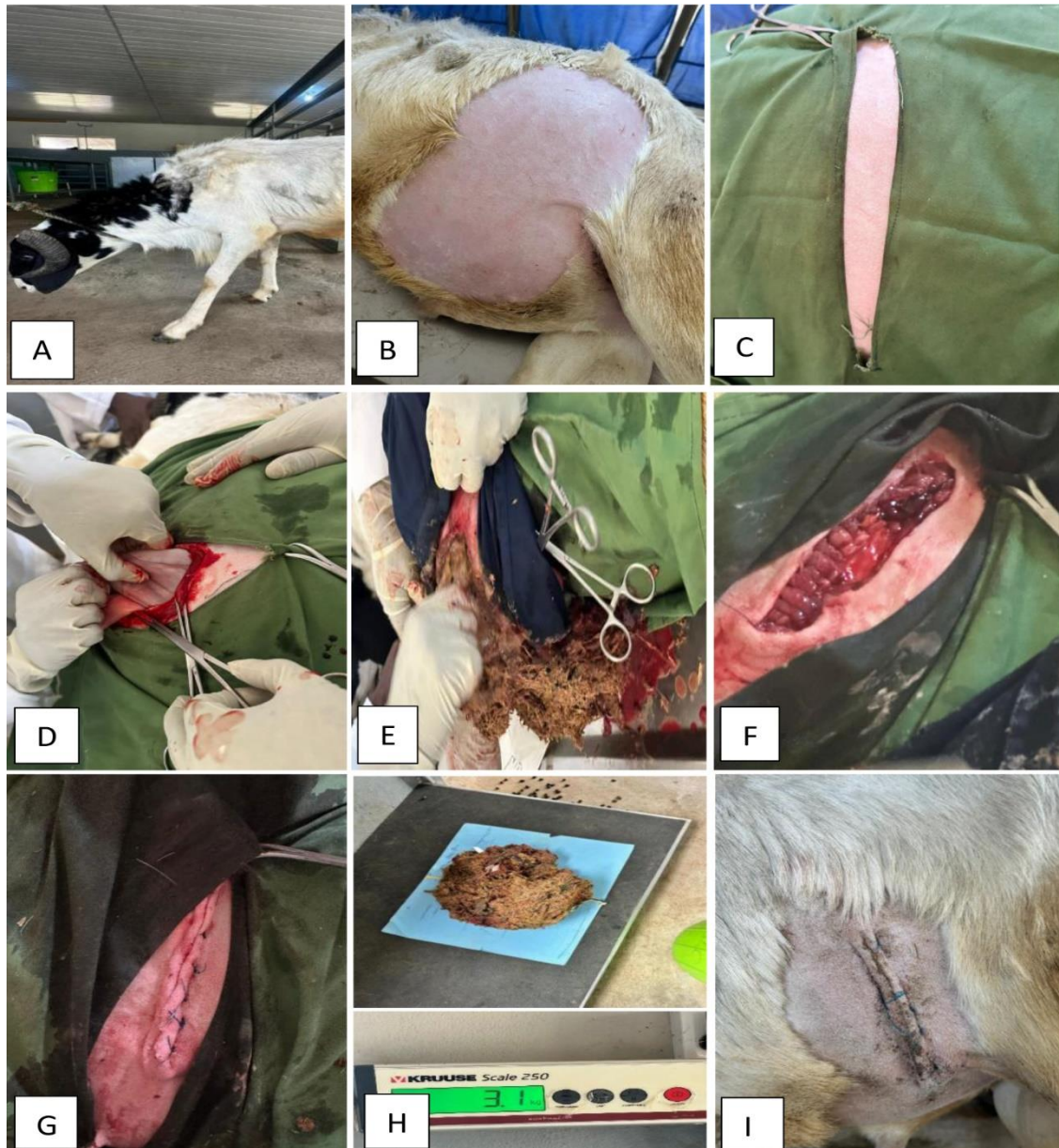


Figure 1. A 3-year-old adult ram with rumen impaction. **A:** Ram on presentation day, **B:** Prepared surgical site, left flank, **C:** Laparotomy applied on surgical site, **D:** Careful exteriorization of the rumen from the abdominal cavity, **E:** Careful removal of the mass from the rumen, **F:** Closing the peritoneum and the muscles in simple continuous suture pattern, **G:** Closing of the skin using horizontal mattress suture pattern, **H:** The mass (polythene bag) removed from the rumen, weighed 3.1 kg, **I:** The surgical site on day 15 post-operative during suture removal.

3. Discussion

Rumen impaction caused by indigestible materials, such as polythene bags, is a significant health concern in ruminants, particularly in developing countries where plastic pollution increases the risk of ingestion². Similar observations were documented by Hailat et al.¹², who reported a high incidence of rumen foreign bodies in sheep reared in an urban waste area, attributing this condition to inadequate environmental waste management. Additionally, Igbokwe et al.¹³ described polythene ingestion as a major cause of rumen impaction in small ruminants in Nigeria, emphasizing the growing association between urban areas and livestock exposure to plastic waste. The present case was a ram with rumen impaction, presenting inspiratory dyspnea due to diaphragmatic impediment, highlighting the severity

of the case and respiratory complications. The clinical findings of elevated rectal temperature (40.7°C), rapid costo-abdominal respiration, inspiratory dyspnea, bruxism, slightly congested mucous membranes, absent rumen motility, and a palpable rumen mass confirmed the diagnosis of rumen impaction, likely caused by polythene bags². These findings were consistent with the study of Radostits et al.⁶ who described ruminal atony, abdominal discomfort, and reduced rumination as characteristic features of rumen impaction. Similarly, Sala et al.¹⁴ reported decreased rumen motility and signs of abdominal pain as a clinical signs of indigestible foreign body accumulation in small ruminants. The inspiratory dyspnea, a critical finding, highlighted the impact of the foreign body, increasing the diaphragmatic pressure from rumen distension, thereby reducing thoracic volume and impairing ventilation. The impacted polythene material

weighed 3.1 kg and caused inspiratory dyspnea and absent rumen motility. A comparable mechanism has been described by Constable et al.¹⁵ who noted that excessive rumen distension can restrict diaphragmatic excursion and result in respiratory distress in advanced cases. Asrat et al.¹⁶ reported a case of bovine rumen impaction with a large foreign body (approximately 10 kg) presenting with chronic recurrent tympany and ruminal atony, but did not explicitly describe respiratory compromise. These findings suggested that several factors, including the location and composition of the affected material, may affect the severity of the respiratory problem. The elevated temperature and bruxism observed in the impacted ram suggested an inflammatory response and pain, potentially due to rumenitis. Meanwhile, the normal hematological parameters and pulse rate (120 beats per minute) indicated that the animal was presented to the clinic promptly for intervention, thereby preventing systemic decompensation. Surgical correction via rumenotomy, as described in the present case, effectively addressed the impaction. The meticulous surgical procedure demonstrated adherence to aseptic standards, minimizing complications. The use of Polyglactin 910 for continuous sutures ensured secure abdominal closure, while the interrupted horizontal mattress with silk suture provided robust skin apposition¹⁷. The closure of the skin using a horizontal suture pattern aligns with established rumenotomy protocols, which report recovery rates of 80-90% in similar cases. The rumen access approach was similar to that described by Martin et al.¹¹, while the tension-relieving mattress sutures used for skin closure were supported by Islam et al.¹⁸, who demonstrated that cross-mattress patterns provide secure apposition and favorable healing in ruminants. The successful removal of the impacting mass likely alleviated diaphragmatic pressure, thereby restoring respiratory function; however, specific postoperative outcomes were not documented reported. A prevalence rate of 30.73% has been reported for indigestible foreign bodies in domestic ruminants, with goats (32.75%) and sheep (28.00%) exhibiting a high susceptibility, especially in areas with high levels of environmental contamination with plastic waste¹⁹. The present study aligns with previous findings indicating that polythene bags constitute 70-80% of rumen foreign bodies in urban livestock². The ram's clinical presentation, including absent rumen motility, is consistent with reports of indigestible materials disrupting rumination¹². Dyspnea, though less frequent, occurs in severe cases, as noted in the present study, in which the rumen mass mechanically hindered diaphragmatic function³. Rumenotomy, although effective²⁰, is expensive and requires skilled veterinary expertise, making it challenging in resource-limited settings. The widespread occurrence of plastic-induced impaction highlighted the importance of preventive strategies, including improved waste management, fenced grazing areas, and farmer education². Reports by Ogbuewu et al.²¹ further highlight environmental waste control as a critical intervention for protecting livestock health²¹. Moreover, polythene bags may release heavy metals into the environment, raising food safety concerns for meat and milk production²².

4. Conclusion

The present study illustrated the life-threatening consequences of polythene-induced rumen impaction in a ram, with successful surgical correction via rumenotomy. Rumen impaction in ruminants highlights the urgent need for integrated veterinary and environmental strategies to address plastic pollution, ensuring ruminant health and sustainable livestock production in vulnerable regions. Limitations in the present study included the single-case design, which limited generalizability, and the absence of diagnostic imaging, such as ultrasonography, to characterize the mass prior to surgery. Postoperative outcomes, such as recovery time and recurrence, were not reported, and long-term rumen function has not been evaluated. Future studies should explore non-invasive diagnostics, such as ultrasonography or biomarkers, for earlier detection and evaluate community-based prevention programs to reduce plastic ingestion.

Declarations

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Authors' contributions

Oluwatimilehin David Durojaiye diagnosed the case, assisted with the surgery, and wrote the manuscript. Iliya Paul Sambo was the chief surgeon. Idris Abubakar also assisted during the surgical procedure and postsurgical management. Oluwatimilehin David Durojaiye and Iliya Paul Sambo revised the manuscript. All authors have read and approved the final edition of the manuscript.

Availability of data and materials

All data supporting the findings of the present study are available in the manuscript and at the University of Jos Veterinary Teaching Hospital, Large Animal Clinic, Plateau State, Jos, Nigeria.

Competing interest

There are no conflicts of interest among the authors of the present study.

Ethical considerations

This original case report is not under consideration or published elsewhere. The manuscript was screened for plagiarism, data fabrication, and falsification prior to publication. No AI tools were used for writing and preparing the present study.

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