



Rumenolith in a Greater Kudu Antelope (*Tragelaphus strepsiceros*) kept in Zoo

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Authors' contributions

This work was carried out in collaboration between all authors. Author DFA designed the study, wrote the protocol, and wrote the first draft of the manuscript. Authors DFA, AA, OGR and MPP managed the literature searches, analyses of the study and author DFA and AA managed the experimental process. All authors read and approved the final manuscript.

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Case Study

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ABSTRACT

A dead, three-and-a-half year-old, female Greater Kudu antelope, weighing 194 kg was presented to the State House Veterinary Clinic Abuja, and was reported to have died the previous night. It had been showing frequent attempt to urinate, rolling on the ground, depression and off-feed for a few of days immediately prior to its death. It was said to have been in an enclosure, on zero grazing, but fed routinely on groundnut haulms and brewer's bran. There was no cutaneous or muscular damage, except for signs of rigor mortis on physical examination of the carcass. Post mortem examination conducted revealed an irregular-shaped oblong mass in the rumen amidst the ingesta, which when exteriorized, felt hard and compact. The mass was discovered to be a rumenolith (mineral concretion in the rumen) weighing 2 kg. Other foreign materials found were a band of rubber tube and a broken piece of dry cell lead battery. Obstruction of the normal flow of rumen

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ingesta by the rumenolith was diagnosed to have resulted in the death of the Kudu. To the best of our knowledge, this present case is probably the first report of a rumenolith in Greater Kudu in Nigeria.

Keywords: Greater kudu (Tragelaphus strepsiceros); postmortem; rumenolith; nidus; rumen.

1. INTRODUCTION

A rumenolith is a mineral concretion or calculus formed around a nidus in the rumen [1]. Gastrointestinal calculi are usually made of calcium, magnesium and phosphorus (struvite), forming round, triangular or flat shapes [2,3,4,1]. Similarly, abomasal concretions have been reported in small ruminants [5,6]. Enterolithiasis on the other hand, has assumed the greatest importance in horses where they cause obstruction of the large intestine [7,8,9]. Current research showed that the cause of enterolithiasis is multifactorial, which includes, basic intestinal pH environment, foreign materials, diets high in calcium, magnesium, and phosphorus as well as minerals from the environment present in soil and water [10,11,8,12,4]. The Greater Kudu (*Tragelaphus strepsiceros*) is the second largest browsing antelope with an average body weight between 180-250 kg [13,14] and a shoulder height between 1.3 m and 1.4 m in females and males respectively [15]. The male horns are the largest amongst the antelopes measuring on average 120 cm and make the Kudu a tourist attraction [16]. Kudus prefer to browse on woody plant leaves and forbs over grass materials which only constitute their diet occasionally [17]. Browsing ruminants in captivity display a high prevalence of diet-related disorders and poor body condition [18,19].

2. CASE REPORT

A dead, three-and-a-half year-old, female Greater Kudu, weighing 194 kg was presented to the State House Veterinary Clinic Abuja (Fig. 1). It was reported to have died the previous night. It had been showing frequent attempts to urinate, rolling on the ground, depression and off-feed for a few days immediately prior to its death. The Kudu was said to have been in an enclosure and on zero grazing, but fed routinely on groundnut haulms and brewer's bran. However, it browsed on the few available grasses in its enclosure. On closer examination, the integument was intact with no evidence of lacerations, punctures or abrasions and no discharges from the orifices. However, the limbs were stiff and the neck was twisted dorsally, indicative of rigor mortis. Post

mortem examination was systematically conducted starting from the head and neck to expose the respiratory organs (trachea, and lungs) down to the abdominal cavity to expose the gastrointestinal tract (Figs. 2 and 3). The lungs appeared congested on examination of the respiratory organs (Fig. 3). The gastrointestinal tract was exteriorized from the carcass and incised longitudinally along its entire length (Fig. 4). Examination of the rumen revealed an irregular-shaped oblong mass in the rumen amidst the ingesta, which when removed, felt hard and compact (Fig. 5). Obstruction of the normal flow of rumen ingesta by the rumenolith was diagnosed to have resulted in the death of the Kudu. This is evident by the bulk of ingesta present in the rumen despite the animal being off-feed for some days as reported. Other foreign materials found were, a band of rubber tube and a broken piece of dry cell lead battery (Fig. 6). On washing the mass, it was discovered to be a rumenolith weighing 2 kg (Fig. 7).

3. DISCUSSION

In this present report, the Kudu was reported to have been fed routinely with Miller's bran and groundnut haulms. The rumenolith mass we found was an irregular-shaped oblong mass against the triangular shape reported in Bapedi ram [1]. This appeared to have formed as a result of the ingestion of polythene bags which formed the nidus of the concretion. This may have been due to mineral deficiency, resulting in the Kudu ingesting salty polythene bags found in its environment. However, in the Bapedi ram Rhoda and Gareth [1] reported a tangled framework of synthetic threads as the rumenolith nidus. The rumenolith here obstructed the normal flow of ingesta which may have resulted in signs of colic before the death of the Kudu. Diagnosis of rumenoliths can be made at surgery, necropsy or by radiographic examination of suspected animal [20]. However, in this case report, the rumenolith was diagnosed at postmortem examination. Treatment is by surgical intervention where rumenolithiasis has been diagnosed. Grasses or hays have lower protein and magnesium levels, and are known to prevent enterolithiasis [9].



Fig. 1. Dead greater kudu (*Tragelaphus strepsiceros*) on presentation to the clinic



Fig. 2. Opening up of greater kudu for post mortem examination

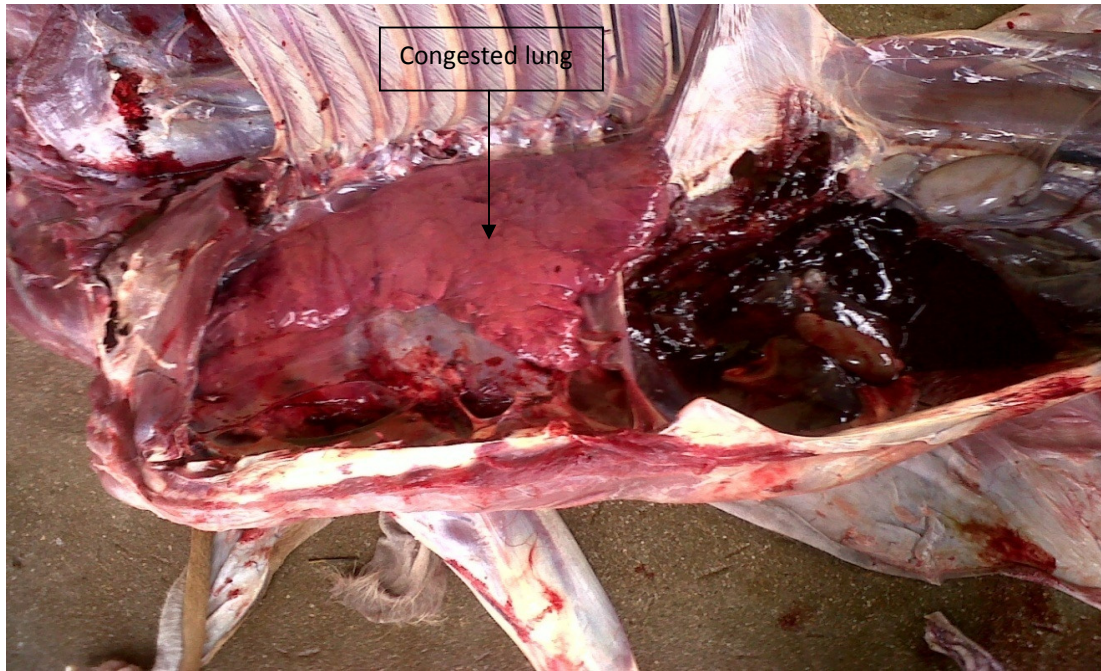


Fig. 3. Greater kudu opened up at post mortem examination



Fig. 4. Exteriorized gastrointestinal tract of the greater kudu with the rumen cut opened

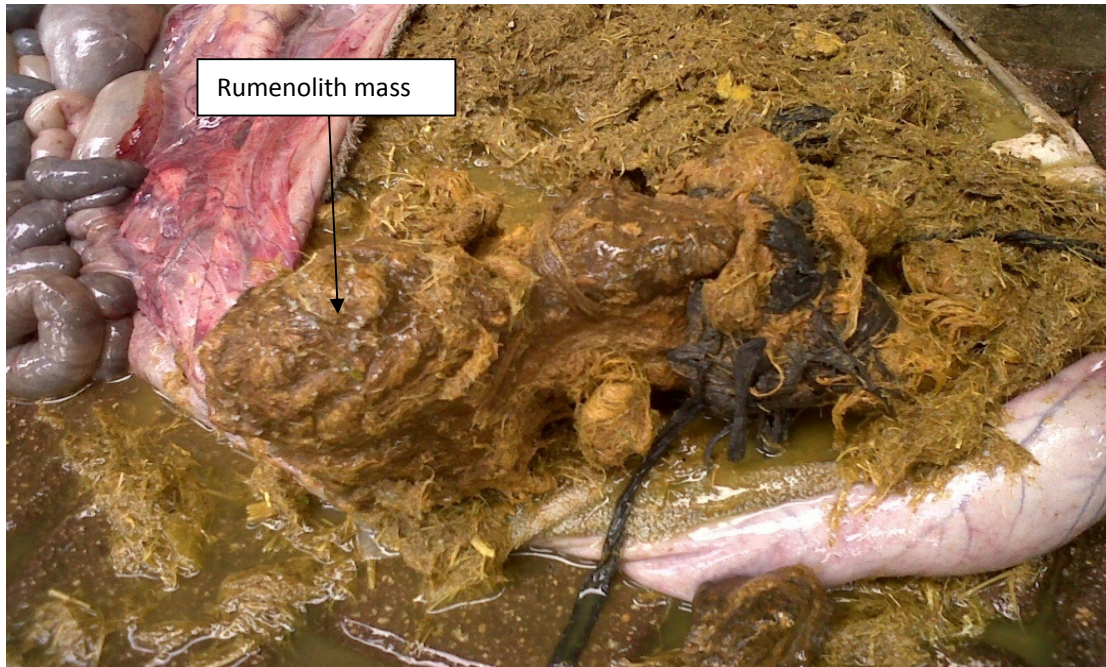


Fig. 5. Incised rumen showing rumenolith in-situ amidst ingesta material (ruminal content)

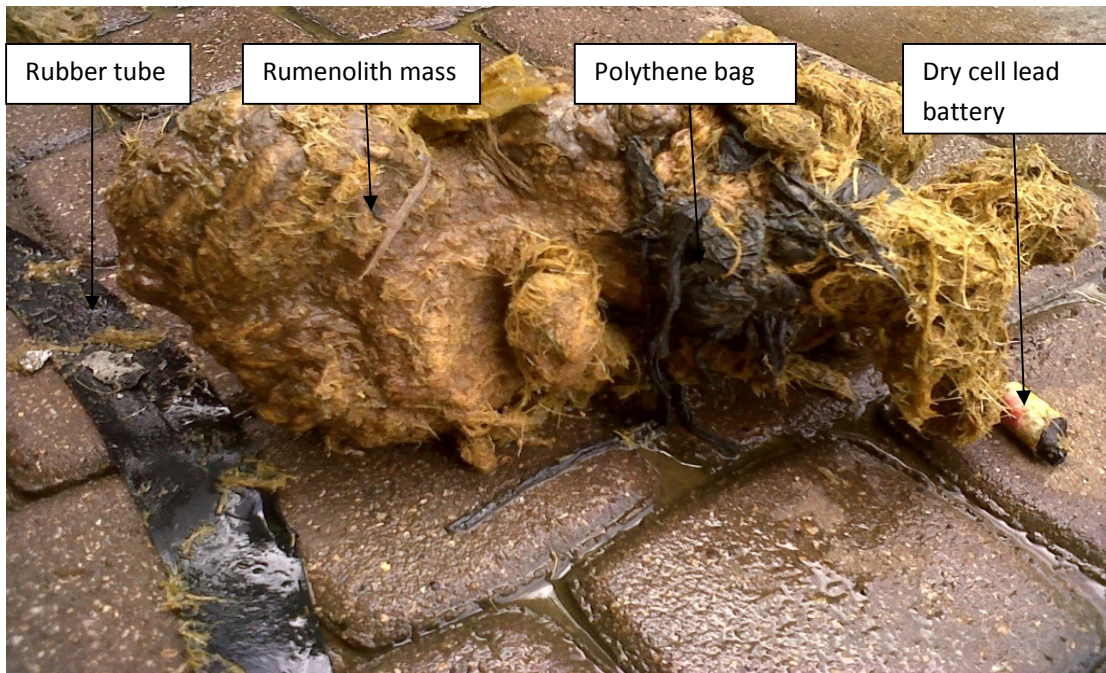


Fig. 6. Mass of rumenolith found in the rumen of the greater kudu



Fig. 7. Mass of enterolith on an analogue weighing scale

4. CONCLUSION

Postmortem investigation of the cause of death in ruminants kept in the zoo, especially the Greater Kudu must include a thorough rumen examination, otherwise foreign bodies such as rumenoliths can go unnoticed. Mineral deficiency and feed shortage are some reasons the Kudu would ingest foreign material that may then result in rumenolith formation. However, early detection of rumenolith through ultrasound will ensure early surgical intervention which may ensure survivability.

COMPETING INTERESTS

The authors declare that there is no conflict of interests regarding the publication of this paper.

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