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Occurrence of foreign body induced ruminal impaction in ruminants-gross findings of necropsy

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Abstract

Foreign body induced ruminal impaction was diagnosed based on gross findings in ten (10) animals which include one (1) cattle, 1 buffalo heifer and eight (8) sheep presented with a common history of long-term anorexia during a necropsy study conducted on forty (40) ruminants. Grossly, all animals revealed presence of various types of foreign bodies in rumen. Additionally, cattle revealed petechiation on diaphragm and epicardium, hydropericardium, septicemic changes on rumen wall, ballooning of intestines with congestion, engorgement of mesenteric blood vessels, suppurative changes in pulmonary and genital system. Buffalo heifer showed congestion of omasum and abomasum with easily peeled off mucosa, abomasal ulcers and changes in lungs, heart and kidneys. On necropsy, sheep revealed sunken eyes, pale conjunctiva, congested viscera, consolidated lungs and dehydrated muscles. Based on the necropsy findings, it was concluded that the foreign body ingestion shows adverse effects on animal health.

Keywords: Rumen impaction, phytobezoars, foreign body, plastic covers, dehydration

1. Introduction

Ruminal impaction is a clinical condition manifested by distension of rumen due to interference with the flow of ingesta by the accumulated indigestible foreign bodies such as a wire or nail or plastic material or trichobezoars or phytobezoars in the rumen leading to passage of scanty or no faeces [1, 2]. It also occurs due to feeding of poor quality hay, straw or roughages deficient in protein and readily digestible carbohydrate, overeating of young grasses, ingestion of mouldy or decomposed feed and exposure to hot and dry weather conditions [3, 4, 5, 6]. The condition is more common in pregnant or young cattle of less than 8 years of age. Large ruminants are more prone to this condition due to lack of highly sensitive prehensile organs like lips and tongue that discriminate sense of taste and making them indiscriminate feeders and their nature grazing close to the ground whereas, goats are least susceptible because of their well-developed sensitive prehensile organs, browsing and selective feeding behavior [7, 8]. Ruminal impaction has gained much economic importance because it causes progressive weight loss, poor milk yield with or without anorexia and high mortality rates [9, 10, 11]. This condition was frequently observed in developing countries due to lack of proper waste disposal systems, low environmental standards, lack of awareness among public towards detrimental effects of non-biodegradable pollutants like plastics and due to lack of strict laws regarding waste disposal [12]. The condition was more significant in urban areas where animals have free access to plastic garbage due to fodder shortage [13]. The common causes responsible for ruminal impaction *viz.*, extensive farming systems, mineral deficiencies, negative energy balance during pregnancy and lactation, industrialization, drought and floods. This condition without surgical intervention eventually leads to death following indigestion and recurrent tympany [14].

The present paper details about the necropsy findings of foreign body induced ruminal impaction in ruminants which were presented to Department of veterinary pathology, College of Veterinary Science, Hyderabad.

2. Materials and methods

2.1 Study area

The present study was carried out on animals from Institutional Livestock Farm Complex (ILFC) and Livestock Experimental Station (LES) belongs to College of Veterinary Science, P

V Narsimha Rao Telangana Veterinary University, Rajendranagar, Hyderabad and circumstantial evidence revealed that the farms were located close to the human dwelling areas.

2.2 Study design

A total of 40 dead ruminants (4 cattle, 1 buffalo heifer, 35 sheep) of various age groups were presented for routine necropsy to the Department of Veterinary Pathology, College of Veterinary Science, Rajendranagar, Hyderabad during February 2018 to August 2019. Out of 40 animals, 10 cases (1 cattle, 1 buffalo heifer and 8 sheep) clinically had a history of long-term anorexia, emaciation and lethargy. Prior symptomatic treatment was done but there was no improvement. Additionally, dystocia, postpartum prolapse and long lasting recumbency were observed in cattle.

2.3 Postmortem examination

Necropsy was conducted on all dead animals as per the standard protocols given by the author [15] and observations were noted simultaneously. On necropsy, the above mentioned 10 animals had various types of foreign bodies in the rumen which were recovered and weighed using electronic balance.

3. Results and Discussion

On necropsy it was revealed that 10 out of 40 animals were suffered with foreign body induced ruminal impaction and the foreign bodies recovered from rumen include plastic material, rope, phytobezoars, small tiny stones and undigested feed mass. The present paper depicts gross necropsy findings of foreign body induced rumen impaction. Necropsy examination of cattle revealed emaciation, sunken eyes, abnormally distended rumen and reticulum, presence of polyethylene covers (approximately 15kgs) and rope (approximately 2 kgs) in rumen, petechial hemorrhages on diaphragm, septicemic changes on rumen wall, ballooning of intestines with congestion and engorgement of mesenteric blood vessels (Fig. 1, 2 and 3). In addition to this, suppuration and consolidation of lungs apical lobes and suppuration of caruncles, hydro pericardium (approximately 50 mL of coffee colored fluid) and petechiation on epicardium were also observed (Fig. 4, 5 and 6). This condition might be due to increased appetite due to nutritional demands and hormonal changes in pregnancy, indiscriminate feeding habits due to lack of highly sensitive prehensile organs like lips and tongue and their nature of grazing close to the ground. Similar opinion was expressed by the authors [7, 8, 16]. According to author [17], ruminants with advanced gestation are more prone to the condition due to pressure over intestines by gravid uterus which obliterates free flow of ingesta.



Fig. 1: Carcass of cattle showing retrieved plastic covers and rope from rumen and ballooning of intestines.



Fig 2: Recovered plastic covers and rope from cattle rumen.



Fig 3: Diaphragm of cattle showing petechial haemorrhages (arrow).



Fig 4: Consolidation and suppuration in the apical lobe of lung (arrow).



Fig 5: Necropsy of cattle showing suppurative changes in caruncles (arrow).



Fig 6: Petechial haemorrhages on the epicardium of heart (arrow).



Fig 8: Retrieved phytobezoar from rumen.

Buffalo heifer showed distended rumen and reticulum with phytobezoars (approximately 10×4 cm² and 100-300 g), plastic material (approximately 500-750g), small tiny stones and undigested feed mass, severe congestion of omasum and abomasum with easily peeled off mucosa and ulceration in the abomasum (Fig. 7, 8 and 9). Additionally, pulmonary changes like severe congestion of apical lobe, moderate to severe congestion of other lobes, presence of frothy exudate in trachea, bronchi and bronchioles, cardiac changes include hydro pericardium (approximately 60 mL of straw colored fluid), severe congestion of epicardium, severe hypertrophy of left ventricle and renal changes like swollen kidneys with bulged out from capsule, intestines with petechiation and presence of catarrh in the lumen. In the present study, this condition could be due to their abnormal appetite due to demands of nutrition during estrus period [18]. Occurrence of phytobezoars in rumen might be due to feeding on low quality feeds and this agrees with the opinion of author [9] who reported that the phytobezoars can occur in ruminants ingesting large quantities of poor quality fibrous feeds or plants covered in fine hair. Putrefied ingesta liberates toxic amines like histamine in rumen which after absorption into circulation increases blood urea nitrogen (BUN) concentration [19] and this might contribute to renal changes in the present study. According to authors [7, 8], this condition was frequently noticed in pregnant and young ruminants of less than 8 years age and the opinion was supported with the case details of cattle and buffalo heifer in the present study.



Fig 9: Buffalo heifer's rumen with plastic cover.

On necropsy, sheep revealed gross changes like distended rumen with plastic covers (approximately 500-750 g), congestion of viscera, consolidated lungs, dehydrated muscles, sunken eyes and pale conjunctival mucous membranes (Fig. 10 and 11) which might be due to indiscriminate feeding habits [20]. According to authors [21], nutritional deficiencies like Pica also responsible for onset of foreign body induced rumen impaction.



Fig 7: Phytobezoars and undigested feed mass in rumen of buffalo heifer (arrow).



Fig 10: Carcass of sheep showing sunken eyes and pale conjunctiva.



Fig 11: Sheep rumen with non-biodegradable polyethylene covers.

In the present study, major gross findings were observed in rumen due to their larger size which accommodates greater volume of feed admixed with foreign bodies and the observations are similar to the previous studies [20]. In the present study, pulmonary, cardiac and diaphragmatic changes could be due to forward pressure by the distended rumen and reticulum over thoracic region. Anterior pressure by distended rumen over diaphragm and ribs limits respiratory movements leading to hypoventilation and decreased venous return to the heart [22] and this statement supports the vascular changes like congestion of viscera in the present study. Dehydration could be due to reduced water intake and this agrees with the statement of author [23] who reported that the reduced water intake might be due to sequestration of fluid in the fore stomach due to the obstructive effect of the impacted plastic bags in the rumen. Suppuration in the present study might be due to entry pathogens into circulation from putrefied ingesta through damaged rumen wall and the opinion was supported by author [24] who observed histopathological changes in rumen wall due to the pressure caused by the foreign body.

4. Conclusion

Based on the gross necropsy findings, it was concluded that the environmental pollutants could pose a serious health issues in animals especially in urban areas and this may contribute huge economic losses in animal production. Hence, it is recommended to implement proper waste disposal systems to minimise ingestion of foreign bodies by the animals. In addition to this, keep animals under positive energy balance and bring awareness among owners to keep animals away from garbage area.

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