



Case Report

An unusual large polythene bezoar in the rumen of a fallow deer (*Dama dama*):

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Abstract

Ingestion of indigestible foreign bodies in both domestic and wild ruminants are very common. Indigestible foreign materials can be ingested during free range grazing or under captivity in zoos or game parks. There are different types of bezoars in literature. The most common in animals are phytobezoars, trichobezoars, lactobezoars, phytotrichobezoars, lithobezoars or pharmacobezoars. This is a case study of an adult (4 years old), 40 kg body weight female Fallow Deer (*Dama dama*) which was reared with other four more Fallow Deer does at Riyadh Zoological Garden. The doe was found sluggish and weak. On presentation the veterinarian of the zoo noticed the anorexia, pale mucous membranes and dullness. There was Normocytic Normochromic anaemia, low RBCs and Haematocrit level, high neutrophil count and leucocytosis. The doe was subjected to medicinal and supportive therapy but she could not recover and found dead on very next day. On post-mortem examination, an unusual large polythene bezoar along with calcified stony mass recovered from the rumen. The results suggested that the rumen impaction in the Fallow Deer might be due scavenging on refused Plastic dumps in the premises left over by visitors to the zoo and that the blood biochemical alterations, alongside clinical signs, might be of some diagnostic assistance.

Key words: Fallow deer, polythene bezoar, rumen, zoo animals.

Introduction

Many species including humans, pets, ruminants and wild animals have been reported as facing complications of foreign bodies (bezoars) at different compartments of the gastrointestinal tract (8). The word bezoar is originated from Arabic “badzehr” meaning an antidote for poisons. In old times, bezoars recovered from goat were considered as having healing properties from medicinal perspective (3). Depending on the nature of content in the gastrointestinal tract, there are different types of bezoars including phytobezoars, trichobezoars, lithobezoars, phytotrichobezoars, lactobezoars and pharmacobezoars (13).

In ruminants, it is observed that due to fibers or trace elements deficiency (copper, cobalt, zinc, calcium,

phosphorus as well as vitamin and protein deficiency) an unusual behavior called trichophagia could be observed. This behavior is associated with continuous suckling of congeners or excessive licking of skin due to lice or mange infestation. Fallow Deer are widely living as natural or naturalized wild ruminant populations. Furthermore, they can also be found in game parks and zoos (4). Although both domestic and wild ruminants have different apprehension than bovines, they have tendency to ingest indigestible foreign materials like plastic slings and bags that may become an advent of bezoars formation alongside of undigested nutrients (15). The ingestion of plastic materials may conglomerate with undigested plant fibers or hairs and accumulate in rumen and abomasum. Under the induction of ruminal and abomasal movements, various conglomerates

may agglutinate firmly in one single forestomach. If the size of bezoars is small, they can go through intestine and cause mucosal ulcers and melena (3). Ruminant Impaction due to ingestion of foreign materials during grazing is not well reported in wild ruminants as they are selective feeders. The grazing behavior of fallow deer is also influenced by season and food availability (14). The incidences of polythene materials ingestion are documented by various researchers in domestic ruminants but information is still lacking in wild ruminants. The entrance and migration of foreign body objects through the various tissues and organs of the body induce many complications depending upon the nature of foreign objects and its entrance through the body tissues. Ingestion of plastic material and other indigestible foreign objects may cause detrimental effects in free grazing wild ruminants (18). Moreover, these plastic wastes are associated with the deaths of wild and domestic animals. Therefore, it is very crucial to take precautionary measures to safeguard wild animal species from extinction (10). Plastic industry is growing at exponential rate on global scale. Moreover, in developing countries, due to over population, the number of plastic manufacturing sectors has increased. The disposal of plastic waste material in developing countries is very poor due to low environmental standards, substandard socio-economic status, poor hygiene and living standards, improper handling of plastic waste, lack of implementation of strict laws regarding plastic waste disposal, lack of awareness in public and other various factors (2). The complications due to blockage of reticulo-omasal orifice by polybezoars may include rumenitis, regurgitation, aspiration pneumonia and even death. It is observed that the visitors left plastic bags during visiting animal enclosures. Sometimes the children offer popcorns to deer and other wild ruminants and they left the plastic bags there which is a potential risk for deer to ingest those bags (9). The aim of this case report was to highlight the death of an adult female Fallow Deer due to the presence of unusual large plastic bezoar in rumen.

Case Report

An adult (4 years old), 40 kg bodyweight female Fallow Deer (*Dama dama*) belonging to Riyadh Zoological Garden was found sluggish, emaciated and unable to walk properly. The female Fallow Deer lived with other four does in the enclosure and was fed specifically on grains and on a small area of pasture with supplementation of hay, silage and minerals. The Fallow Deer doe was regularly dewormed. It was isolated from the herd of Fallow Deer and kept under individual observation. On physical examination, the veterinarian noted poor body condition, pale mucous membranes, normal lymph nodes volume, bradycardia, low respiration rate and atonic rumen. The veterinarian of the zoo observed the over grown hooves of the doe. Therefore it was planned to sedate the animal to help her in hoof trimming. The animal was darted with Anaesthetic drugs but she didn't even move at all upon

darting, so the severity of the case was sensed. Blood samples were taken immediately for laboratory analysis.

The doe was rehydrated with intravenous infusion (2000 ml of 5% dextrose and 120 ml of Duphalyte® solution and 1000 ml of Ringer's lactate solution) to compensate electrolytes imbalance and vitamins loss respectively. Anti-inflammatory drug (Meglugin® 2 mg/kg, IV) was used to overcome pain. The doe was treated with antibiotics (Oxytong 20® 20mg/kg, IM). Moreover, to boost up liver digestive functions, liver tonics (Ornipural® 10ml, IM) were used. Infusion of Luke warmed saline solution along with vitamin B complex (Supertone® 25ml, IV) were also administered. The animal's hooves were trimmed and pain was relieved temporarily but the doe was found dead on the next morning.

The haematology and biochemical profiles of the Fallow Deer doe showed low hemoglobin, low RBCs, low PCV, high WBCs, Neutrophilia, high bilirubin and severe hypoglycemia. The results of hematology and biochemical tests were reported in tables 1 and 2 respectively. Reference limits of the values were illustrated by previous studies (20).

Table 1. Hematology report of the adult doe before its death

Test	Result	Unit	Reference range
Hemoglobin	8.3	g/dL	10 - 16
MCV	47	fL	24.5 - 49.1
RBCs	5.3	x10 ⁶ /μL	5 - 10
PCV	24.9	%	30 - 49
WBCs	13.3	x10 ³ /μL	2.1 - 9.7
Lymphocyte	0.2	x10 ³ /μL	1 - 2.1
Monocyte	0.1	x10 ³ /μL	0.1 - 0.5
Neutrophil	13	x10 ³ /μL	1 - 5
Eosinophil	0	x10 ³ /μL	0 - 1.2
Basophil	0	x10 ³ /μL	0 - 1

Table 2. Blood biochemistry report of the adult doe before its death

Test	Result	Unit	Reference range
Albumin	12	g/dL	23 - 30
Total Proteins	71	g/dL	58 - 75
Total Bilirubin	11	mg/dL	0 - 8.9
Glucose	2.6	mg/dL	8.4 - 14.9
BUN	13.3	mg/dL	6.5 - 12
Creatinine	127	mg/dL	90 - 221
ALT	18	UI/L	16 - 160
Alkaline Phosphatase	61	UI/L	11 - 652
Calcium	1.2	mg/dL	2 - 2.9
Phosphorus	2.31	mg/dL	1.4 - 2.5
Na	138	mmol/L	141 - 151
K	6.3	mmol/L	4.7 - 6.7



Figure 1. Large size Polythene bags strips entangled with undigested plant fibers.

The necropsy was carried out and there was no sign of rumenitis. Rumen and reticulum were found slightly impacted. An unusual large plastic (polythene bags) bezoar was found in the rumen. The bunch of polythene carry bags impregnated with other undigested ruminal contents and mineral deposits were partially blocking the rumino-reticular openings of the rumen (fig. 1). A small stone like hard bezoar of mineral deposits (mainly calcium and magnesium) was also entangled within the large polythene bezoar (fig. 2). The plastic bezoar recovered from the rumen was 2.2 kg in weight with approximate length of 0.45 m. Other post-mortem findings included pale, discoloured liver with firm consistency. There was distension of intestine due to impaction of gases. All these findings indicated a severe impaction due to foreign bodies (polythene bezoar) in rumen.

Discussion

The occurrence of bezoars from plastic material pollution and other indigestible fiber crops formed compact masses in the rumen. In case of human pathology, the stomach is the most common compartment for bezoars formation followed by intestine while in case of ruminants, the rumen (87.2%) is the most common place for bezoars followed by reticulum (12.8%) and abomasum (1). The main type of bezoars are formed from plastic debris with



Figure 2. A hard stone like mass of mineral deposits entangled within bunch of polythene bags.

a range of 52.33-59.00% followed by a variable range of textile, cotton, rope, plastic-cotton, plastic gloves, plastic-textile, plastic-textile-cotton, hair balls and phytobezoars. The agglutination of bezoars starts from ingestion of nylon waste material along with high amounts of indigestible fibers which includes cellulose, hemicellulose and lignin. The absence of pyloric function, slow gastric motility, inadequate chewing and indigestible fibers consumption are the major predisposing factors which are responsible for bezoars in ruminants' intestine (5). Presence of foreign bodies in the forestomach is not uncommon in different species of deer (16). In a study conducted on free range Axis Deer to check the prevalence of poly-bezoars and its effects. During this study, out of 19 post-mortem examinations, 4 cases (21.05%) showed poly-bezoar (7). A case of an adult female Spotted Deer (*Axis axis*) who was reared in the college livestock farm died suddenly due to ingestion of large size polythene bags was also reported (9). A case of phytobezoar occurrence in the reticulum of a Barking Deer (*Muntiacus*) at Nainital Zoo was reported in 1997 (17). In the present case report, the occurrence of polythene bezoar in the Fallow Deer may be attributed to the fact that the doe had access to the unwanted plastic debris. Moreover, the plastic shopping bags left over by the visitors to the zoo was suggested to be the cause of the bezoar in the Fallow Deer. Significant decrease in haemoglobin and PCV along with

leucocytosis and neutrophilia may be due to deficiency of nutrients in diet (12), presence of foreign bodies, sloughing, erosions, inflammatory response and the hyperplasia owing to the pressure on the wall of the rumen caused by indigestible foreign bodies (6). Although histopathology was not performed, hyperbilirubinemia might be related to failure of liver to remove unconjugated bilirubin from the serum (11). The dietary malnutrition in the doe could be associate with hypoalbuminemia and stress reaction. High level of BUN might be due to inadequate rumen fermentation and reduced microbial activity. Hypoglycaemia could be due to decrease in feed intake, anorexia and depression. Moreover, low level of calcium (hypocalcaemia) might be attributed to faulty calcium absorption and diminished ruminal motility (19).

Conclusion

From this study, it can be concluded clearly that the plastic waste and other indigestible foreign materials could be lethal in domestic and wild ruminants that are grazing in urban premises or under captivity in zoos. Rumen impaction causes serious complications like anorexia, depression, abdominal distension and inability to defecate normally. There was significant alterations found in the blood and the biochemical properties of the Fallow Deer. This case report once again highlights the potential hazard to wild and domestic ruminants as a consequence of improper disposal of plastic litter. Despite active treatment efforts and supportive therapy, the Fallow Deer doe could not survive and died due to large size polythene bezoar impaction in the rumen. Awareness should be created to avoid careless disposal of plastic bags as well as intermittent cleaning of these waste materials from the premises of wild animals.

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