



## PREVALENCE OF INDIGESTIBLE RUMEN AND RETICULUM FOREIGN BODIES IN ACHAI CATTLE AT DIFFERENT REGIONS OF KHYBER PAKHTUNKHWA

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### ABSTRACT

The present cross sectional study was conducted on 350 Achai cattle (81male, 269 female) from January, 2013 to May, 2013 at Livestock Research and Development Station Surezai, Peshawar, Peshawar Main Abattoir and 10 butcher shops in different regions (Swat, Malakand, Dir, Bajaur and Shangla) of the whole province to document the prevalence of rumen and reticulum foreign bodies and associated risk factors for the occurrence of foreign bodies in Achai Cattle which is known as local breed of the region, because many animals that have swallowed foreign bodies are asymptomatic, veterinarian must maintain a high index of suspicion in conducting post mortem examination. The study animals were selected by using stratified random sampling method from the study population. From the total of 350 animals examined, 207 (59.14%) were found positive for the occurrence of indigestible foreign bodies in rumen and reticulum. From each 81 male examined 30 (37.03%) and 269 female examined 177 (65.8%) were found Positive, respectively. The overall prevalence of foreign bodies was 59.14%, the types of foreign bodies detected were Clothes (14.49%), Plastic (12.85%), Nail (12.07%), Rope (11.49%), Hair (11.11%), Plastic, Leather and Clothes (7.24%), Wire ( 6.76%), Leather (5.89%), Nail, Plastics and Clothes (5.89%), Wire and Nail (5.3%), Nail, Plastics and Wire (3.38%), Plastic, Leather and Clothes (1.93%), Plastics and Leather (1.44%). Prevalence of foreign body occurrence recorded in  $\leq 3$  year 75 (36.23%), Adult 3-7 year 69 (33.33%) and Old 7-11 year 63 (30.43%) respectively while the prevalence rate recorded in thin, average, fat and obese animals was 54.5, 77.14, 55.07 and 39.62%, respectively. Younger cattle were more affected than adult and old cattle. The present study revealed that inappropriate solid wastes disposed in the study area not only pollute the environment but also have adverse effects on healthy ruminants. The prevalence of foreign body ingestion found in ruminants by this study shows that littering the environment with plastic bags and other indigestible materials could pose serious health problem for free grazing ruminants, therefore appropriate solid waste disposal system need to implement in the study area to prevent health risk for ruminants and also to protect the environment.

**Keywords:** foreign bodies, indigestion, ruminants, prevalence, abattoir, reticulum.

### INTRODUCTION

Achai cow for its characteristics, inter alia, of good weather adaptability, suitability for the area, docility, Achai cow usually reproduces after one and a half year and may give birth to three calves against the one or two on high fertility and good conception rate. The cow is suitable for the area terrain and weather, it can resist cold and warm climate, it has a small body and thus needs little food but gives more milk as compared to its size and food, it has double conception rate than other national breeds, and it also has better fertility (Tahir Ali, 2013). The achai cattle are freely grazed in villages, town and hilly areas so these free grazing animals eat plastic bags, other foreign materials which are indigestible and their accumulation in the rumen of grazing animals may lead to adverse effect on health (Ghurashi *et al.*, 2009).

The share of livestock in the agriculture ADP has also decreased to Rs 0.379 billion (26 per cent) this year from Rs 0.60 billion (44 per cent) in the last fiscal year, reducing its share in total ADP from 0.70 per cent last fiscal to 0.38 per cent in the current ADP. Most of the districts still have no model dairy, beef and poultry farms

there. Expansion of animal healthcare system and evolution and promotion of high yielding fodder varieties have also been neglected.

Khyber Pakhtunkhwa has around 6 million cows of different breeds but none of these have been utilized to produce genetically superior and high yielding species so for.

Though there are several indigenous cattle breeds like Lohani in Kohat and Gabrali in swat that need conservation and development. Gastrointestinal foreign bodies are among the most common cause of death in veterinary medicine. Sheep and goats are highly selective feeder and ingest significantly less amount of foreign bodies as compared to cattle (Hailat *et al.*, 1996). Cattle are more susceptible to foreign body syndrome than small ruminants because they do not use their lips for prehension and are more likely to eat chopped feed; lack of oral discrimination in cattle may lead to ingestion of foreign bodies which would be rejected by other species (Misk *et al.*, 1999). Ingestion of foreign bodies in cattle is result a condition of great economic importance and causes severe loss of production and high mortality rate (Radostits *et al.*,



2007). There are many potential causes of abdominal disorders in cattle and buffaloes. Traumatic reticuloperitonitis (TRP) is a relatively common reason for abdominal surgery in both species. The importance of this disease is not only due to its higher prevalence among other digestive disorders (Maddy, 1954). Animals with foreign bodies show inappetence for several days or complete anorexia with evidence of loss of weight, an enlarged apple shaped abdomen; pear shaped or right and apple shaped or the left with or without bloat.

In cattle, ingestion of foreign body was reported to be a condition of great economic importance as it causes loss of production and high mortality rates (Radostitis *et al.*, 2000a, b; Ramin *et al.*, 2008). The ingestion of indigestible materials may occur during period of feed scarcity (Igbokwe *et al.*, 2003). Reports from cattle and sheep reared within urban and sub-urban environments indicates that impaction of the rumen resulted from the accumulation of foreign bodies such as plastic bags interfered with flow of ingesta leading to the distention of rumen (Abdullahi *et al.*, 1984; Igbokwe *et al.*, 2003; Remi-Adewunmi *et al.*, 2004). The presence of foreign bodies in the rumen and reticulum also hampers the absorption of volatile fatty acids and consequently reduction in the rate of animal fattening (Igbokwe *et al.*, 2003).

In Pakistan particularly in Khyber Pakhtunkhwa, Achai cattle are kept under an extensive type of management and are very likely to be exposed to the ingestion of indigestible garbage of various sources due to a wide spread environmental contamination with plastic bags, absence of policy to protect the environment from such insults and the frequent occurrence of drought that predispose animals to nutritional deficiency and pica. Despite the presence of the predisposing factors, the study so far conducted in Khyber Pakhtunkhwa on the prevalence of indigestible foreign body ingestion by Achai Cattle was scarce.

## MATERIALS AND METHODS

The present cross sectional study was conducted on 350 Achai cattle (81 male, 269 female) from January, 2013 to May, 2013 at Livestock Research and Development Station Surezai, Peshawar, Peshawar Main Abattoir and 10 butcher shops in different regions (Swat, Malakand, Dir, Bajaur and Shangla) of the whole province. The Abattoir and butcher shops were found in districts which are known as the origin place of Achai cattle.

### Study design

The total sample size, 350 Achai cattle comprising 81 male, 269 female was determined as described by Pfeiffer (2002) and the study animals were selected by stratified random sampling technique. Each animal selected for the study was further identified by providing a unique identification number that could be used for both ante and post mortem examinations of the animal. After post mortem or slaughtering, the stomach was carefully removed from the abdominal cavity and placed in a container. Rumen and reticulum were incised and thoroughly examined by visual inspection and palpation. All the contents were examined thoroughly for the presence of foreign bodies. Magnets were used for the detection of metallic objects. Then the foreign bodies were washed, dried, identified and labeled.

### Data management and statistical analysis

As a scientific work the study should have to be carried out by determining the species of each animal and the values of its age and body condition score were recorded and entered and managed in Microsoft Excel Work Sheet and SPSS. All data were stored using computer based data management system employing MS excel and analyzed by SPSS software.

## RESULTS



**Table-1.** Age distribution of rumen and reticulum foreign bodies in cattle at LR and DS Surezai, Peshawar, Main Abattoir Peshawar, slaughter houses and different butcher shops of the province Khyber Pakhtunkhwa.

Foreign body	Age			Total
	Young ≤ 3 year	Adult 3-7 year	Old 7-11 year	
Negative for foreign bodies	43 (36.44%)	71 (50.71 %)	29(31.52 %)	143
Wire	5 (4.23 %)	9(6.42 %)	-	14
Nail	9 (7.62 %)	3(2.14 %)	13 (14.13 %)	25
Plastics	11 (9.32 %)	16(11.42 %)	-	27
Leathers	6 (5.08 %)	-	6(6.52 %)	12
Hair	10 (8.47 %)	2(1.42 %)	11(11.96)	23
Clothes	13 (11.01 %)	11(7.85 %)	6(6.52 %)	30
Rope	7 (5.93 %)	13(9.28 %)	4(4.34 %)	24
Wire and nails	2 (1.69 %)	4(2.85 %)	5(5.43 %)	11
Plastics and leathers	1 (0.84 %)	2(1.42 %)	-	3
Plastic and clothes	2 (1.69 %)	-	2(2.17 %)	4
Plastic, leather and clothes	4 (3.38 %)	-	11(11.95 %)	15
Nail, plastics and wire	3 (2.54 %)	2(1.42 %)	2(2.17 %)	7
Nail, plastics and clothes	2 (1.69 %)	7 (5 %)	3(3.26 %)	12
Total	118	140	92	350

p< 0.05

**Table-2.** Frequency of occurrence of rumen and reticulum foreign body in cattle LR and DS Surezai, Peshawar, Main Abattoir Peshawar, slaughter houses and different butcher shops of the province Khyber Pakhtunkhwa.

Foreign body	Location				Total
	No.	Rumen	Reticulum	Rumen and reticulum	
No foreign body	143	0 (0%)	0 (0%)	0 (0%)	143
Wire	-	-	13(32.5 %)	-	13
Nail	-	-	9(22.5%)	-	9
Plastics	-	31(25.61 %)	-	-	31
Leathers	-	9 (7.43 %)	-	-	9
Hair	-	7(5.78 %)	-	-	7
Clothes	-	21(17.35 %)	-	-	21
Rope	-	9 (7.43 %)	-	-	9
Wire and nails	-	-	18(45%)	-	18
Plastics and leathers	-	12(9.91 %)	-	-	12
Plastics and clothes	-	23(19.00%)	-	-	23
Plastics, leather and clothes	-	7(5.78 %)	-	12(26.00%)	19
Nails, plastics and wire	-	2(1.65%)	-	23(50 %)	25
Nail, plastics and clothes	-	-	-	11(23.91%)	11
Total		121	40	46	350

p< 0.05



**Table-3.** Origin of Achai cattle was found determining the frequency of occurrence of rumen and reticulum foreign body in cattle LR and DS Surezai, Peshawar, Main Abattoir Peshawar, slaughter houses and different butcher shops of the province Khyber Pakhtunkhwa.

	Origin							Total
	LR and DS Surezai, Peshawar	Main Abattoir Peshawar	Swat butcher shops	Malakand butcher shops	Dir butcher shops	Bajaur butcher shops	Shangla butcher shops	
No foreign body	17 (37.77 %)	27 (39.13%)	22 (53.66%)	21 (37.5%)	19 (35.84%)	23 (44.23%)	14 (41.18%)	143
Wire	4 (8.9 %)	7 (10.14%)	3 (7.31%)	-	1 (1.88%)	6 (11.53%)	-	21
Nail	2 (4.44%)	4 (5.79%)	-	-	1 (1.88%)	5 (9.61%)	-	12
Plastics	13 (28.9%)	7 (10.14%)	6 (14.63%)	11 (19.64%)	9 (16.98%)	7 (13.46%)	8 (23.52%)	61
Leathers	-	1 (1.44%)	-	1 (1.79%)	-	-	2 (5.88%)	4
Hairs	3 (6.67%)	-	2 (4.88%)	4 (7.14%)	11 (20.75%)	-	1 (2.94%)	21
Clothes	1 (2.22%)	2 (2.9%)	3 (7.31%)	1 (1.79%)	-	2 (3.84%)	1 (2.94%)	10
Rope	1 (2.22%)	5 (7.24%)	1 (2.43%)	3 (5.35%)	-	2 (3.84%)	-	12
Wire and nails	2 (4.44%)	1 (1.44%)	-	2 (3.57%)	2 (3.77%)	1 (1.92%)	-	8
Plastics and leathers	-	-	-	4 (7.14%)	3 (5.66%)	2 (3.84%)	2 (5.88%)	11
Plastics and clothes	-	-	-	6 (10.71%)	-	-	6 (17.64%)	12
Plastic, leather and clothes	-	5(7.24%)	-	3 (5.35%)	-	-	-	8
Nail, plastics and wire	-	9(13.04%)	-	-	7 (13.20%)	-	-	16
Nail, plastics and clothes	2 (4.44%)	1(1.44%)	4 (9.75%)	-	-	4 (7.69%)	-	11
Total	45	69	41	56	53	52	34	350
Total positive	28	42	19	35	34	29	20	207
Prevalence%	62.22	60.86	46.34	62.5	64.15	55.76	58.82	59.14

p < 0.05

**Table-4.** Prevalence of foreign body and body condition score (BCS) of achai cattle.

BCS	No. of examined animals	No. of +ve animals	Prevalence (%)
Thin	123	97	78.86
Average	105	51	48.57
Fat	69	38	55.07
Obese	53	21	39.62
Total	350	207	59.14

p < 0.05

**Table-5.** Prevalence of foreign bodies in achai cattle in association with sex.

Achai cattle sex	No. of examined animals	No. of positive animals	Prevalence (%)
Male	81	30	37.03
Female	269	177	65.8
Total	350	207	59.14

p < 0.05



### Prevalence of foreign body in relation to animal age

From 118, 140 and 92 animals examined with the age of  $\leq 3$  year, 3-7 year and 7-11 year old, 75 (63.55%), 69 (49.28%) and 63 (68.47%) were found positive for foreign bodies ingestion. There was significant difference ( $p < 0.05$ ) between old and young animals in the occurrence of foreign body in their fore-stomachs Table-1. Clothes, Plastics and hairs were more frequently encountered foreign bodies in the fore-stomach of animals between 1-3 years olds whereas adult animals 3-7 year old had only Plastics and Clothes. Nails, Hairs, plastics bag and wire were recovered from the rumen and reticulum of older Achai Cattle.

### Prevalence of foreign body in relation to body condition

From 123, 105, 69 and 53 animals examined with thin, average, fat and obese body condition, 67 (54.5), 81 (77.14), 38 (55.07) and 21 (39.62) were positive for foreign body, respectively. There was significant difference ( $p < 0.05$ ) between different body condition scores and foreign body distribution in rumen and reticulum Table-4.

Plastics, leather and hairs were more frequently encountered in thin (Score 2) Achai Cattle. Average body conditioned (Score 3) Achai Cattle were found to have Leather, plastics, wire and nails. Fat (Score 4) Achai Cattle were found to have Plastics, nail, wire and hair ball while obese or very fat (Score 5) were found to have Plastic and leather foreign bodies in their fore-stomach Table-4.

### Prevalence of foreign body in relation to the stomach compartment affected

From 207 positive cases of foreign body, 121 (58%) were occurred in rumen while 40 (19%) in reticulum and 46 (22%) in rumen and reticulum (Table-2). Occurrence of foreign body was significantly different ( $p < 0.05$ ) in rumen and reticulum.

### Prevalence of foreign bodies with regard to animal origin

Animals for which the post mortems were conducted and slaughtered were come from seven different regions (LR and DS Surezai, Peshawar, Main Abattoir Peshawar, Swat, Malakand, Dir, Bajaur and Shangla).

The highest frequencies of rumen and reticulum foreign bodies observed in cattle originated from District Dir while the lowest from District Swat Table-3. The result also revealed that there exist highly statistically significant differences ( $p < 0.05$ ) in the prevalence among the origin of animals.

### Foreign bodies in relation with sex

Foreign bodies were observed at the maximum of 65.8% in female Achai Cattle compared to Male 37.03% Table-5. There was statistically significant association ( $p <$

0.05) in the frequency of occurrence between male and female.

### Common clinical sign

The most commonly observed clinical symptoms; during the study period include recurrent tympany, suspended rumination, scanty feces, anorexia, rough hair coat and distended abdomen showed by the observed animals.

### DISCUSSIONS

Ingestion of indigestible foreign materials by ruminants is a common worldwide problem previously reported from Nigeria (Igbokwe *et al.*, 2003 Remi-Adewumi *et al.*, 2000) Jordan (Hailat *et al.*, 1997) and Sudan (Ghurashi *et al.*, 2009; Bakhiet, 2008; Mohammed *et al.*, 2006). This study revealed an overall prevalence of 59.14% ( $n = 207$ ) of rumen and reticulum foreign body in achai cattle examined at Livestock Research and Development Station Surezai, Peshawar, Main Abattoir Peshawar, Swat, Malakand, Dir, Bajaur and Shangla districts. Thus this level of prevalence of foreign bodies could bring about paramount economic importance and causes loss of production and even it might cause mortality in animals. Most of the studies on foreign bodies were case reports and their prevalence of foreign bodies is mainly referring sick cattle presented to the livestock research and development station surezai, Peshawar, Abattoir and other slaughtering butcher shops at different districts with clinical signs that leads to suspicion for foreign bodies. The present prevalence rate of foreign bodies is higher than the report of Rahel (2011) 17.07% of prevalence of foresteomach foreign bodies in Hawasa Municipal Abattoir, Ethiopia. Similarly, significantly higher prevalence (77.41%) was reported by (Ismael *et al.*, 2007) of adult dairy cattle cases having indigestible foreign bodies suffering from recurrent rumen tympani in Jordan. Highest prevalence (81.25%) of foreign bodies was detected in cattle greater than 10 year age. This finding is in agreement with the work of Abebe and Nuru (2011) who recovered plastics, leather, clothes and ropes at higher prevalence from the rumen and reticulum of old sheep and goats. Significant prevalence rate of 59.14% was reported in achai cattle which is higher in prevalence rate of 8.9 and 11% reported in ruminants by (Hailat *et al.*, 1997, 1998). The highest frequency of occurrence of rumen and reticulum foreign bodies were detected in animals of poor body condition score animals. Rahel (2011) reported a higher prevalence in animal having poor body condition; these findings are in agreement with our findings. Poor body condition by itself might be due to the contribution of the foreign body that is the animal loss weight after it has been exposed or it might be due to the interference of foreign body with the absorption of volatile fatty acid (VFA) and thus causes reduced weight gain reported by (Rahel, 2011; ismael *et al.*, 2007; Remi-Adewunmi *et al.*, 2004). In the present study clothes have higher frequency of occurrence followed by plastics, nails and wire in female compared to male animals. These



results are in agreement with the findings of Vanitha *et al.*, (2010) stating that, the foreign bodies were found more frequently in female cattle than male in their study on 30 stray cattle having clinical symptoms suggestive of ruminal impaction. Similarly, Zegeye (2011) reported that higher level of occurrence of foreign bodies in female cattle in retrospective study of clinical cases of farm animal in three years period in University of Gondar Veterinary Clinic. Igbokwe *et al.*, (2003) and Roman and Hiwot (2010) have also reported that higher degree of occurrence of foreign bodies in female ruminants compared to male. This may be due to female animals are more exposed to the environmental pollution as they kept for production purpose for longer period of time and the male calves culled soon after calving for saving of feeds. In addition, there might be increased appetite of female animals due to the nutritional demands during pregnancy and lactation.

In this study, ruminants ingested large amount of foreign bodies collapsed even after treatment. This is agreement with the finding of Kahn *et al.*, (1999) they have reported that due to relatively large size, plastic materials are preferentially retained in rumen and at certain time may cause impaction of the rumen leading to death of animals. Ismail *et al.*, (2007) also observed that the presence of large amounts of these materials in the reticulo-rumen. This may be due to the impaction of bodies such as plastic bags interfered with flow of ingesta leading to the distention of rumen and consequently impairs the digestion process.

Metallic foreign bodies were most frequently recovered from reticulum. Radostits *et al.* (2007) reported that in industrialized countries, metallic foreign bodies present in the reticulum up to 90% of normal animals are in line with our findings but the metallic foreign bodies' ingestion was more in war hit areas.

The reason might be due to retention of these foreign bodies by the honey comb structure of the reticular mucosa and their heavy weight give chance to be attracted to the lumen of the reticulum due to gravitational attraction force of these heavy foreign bodies to the ventral part of the forestomach.

The types of foreign bodies detected in this study were plastic, hair ball, leather, polyethylene plastic bag and wire. Hailat *et al.* (1997) also found plastic bags, pins, nails, hair balls, ropes and leather occurring as indigestible foreign bodies. The result of this study indicated that plastics were the most common cause of rumen impaction found in 13% of the cases in the rumen. This is in accordance with the reports of Roman and Hiwot (2010), Hailat *et al.*, (1997) Igbokwe *et al.* (2003) and Remi-Adewunmi *et al.* (2004). This may be attributed to improper disposal of plastics and other ingestible foreign materials in urban and peri urban areas. This study indicated that most foreign bodies occurred in the rumen (58.45%) than reticulum (19.32%) of Achai Cattle. This may be due to the fact that many ingested feed goes to the rumen.

## CONCLUSIONS

It is concluded that the detection of this level of prevalence of foreign bodies in cattle particularly in Achai Cattle is the most not only because of its mortality and morbidity but also it contributes a lot for reduced production and productivity. In order to save the life of animals, residents should not pack and throw the food items, plastics, rope and leather or other materials in plastic bags. The cattle owners may be advised not to allow their cattle to freely wander in streets especially in the cities and populated towns. They should see that the grazing lands are not polluted with the polythene and other wastes. Awareness may be created on careless disposal of plastic bags, rope and leather and as well as the periodical cleaning of these wastes in the grazing area, the study also showed that littering the environment with plastic bags and other indigestible materials could pose serious health problem for free grazing ruminants unless appropriate measure is taken.

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