

PREVALENCE OF FOREIGN INDIGESTIBLE MATERIALS IN THE RETICULO-RUMEN OF ADULT BUFFALOES

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ABSTRACT

Buffaloes (n=320) were examined immediately after slaughtering at the Municipal Slaughter House, Peshawar, for prevalence for indigestible foreign bodies in their reticulo-rumen. Foreign bodies were detected in the rumen and reticulum of 182 (56.88%) buffaloes. In 49.38% buffaloes, foreign bodies were present in the reticulum and relatively small number of buffaloes (7.5%) had such materials in their rumen. The distribution of foreign bodies with respect to type ($P < 0.05$), number ($P < 0.05$) and weight ($P < 0.01$) were different in the two compartments of the compound stomach. Rumen harboured mostly plastic materials while reticulum was the major site for retention of metallic objects. Among the buffaloes found positive for foreign bodies in the rumen, 62.5% had plastic objects followed by metals, nylon cloth, pebbles and rubber objects in 16.7, 12.5, 4.2 and 4.2%, respectively. In buffaloes with foreign bodies in the reticulum, 96.8% had metals, 25.3% had pebbles, 5.1% had compact plastic, 5.1% had marbles and 1.9% had broken teeth along with pieces of bones. The total number of foreign bodies in the reticulum was greater ($P < 0.01$) than in the rumen (943 vs 58). Conversely, the total weight of the material found in the rumen was greater ($P < 0.05$) than that of the reticulum (9.15 vs 4.14 kg). Mean concentrations of microbial nitrogen (mg/100 ml) were 35.65, 30.16 and 26.23 and protozoal numbers ($\times 10^3/\text{ml}$) were 7.53, 7.92 and 5.79 in the rumen fluid of buffaloes free of foreign bodies, having metals and plastic respectively. Variations in both microbial nitrogen and protozoal population were statistically non significant.

INTRODUCTION

Ruminants are notorious for ingestion of foreign bodies. Ingestion of non dietary materials is mainly related to nutritional deficiencies and feeding management of the animals and causes various problems in different organs of the animals. Chellitis, gingivitis, glossitis, lampas, stomatitis, pharyngitis, tonsillitis, choke, esophagitis, rumenitis, impaction of the rumen, traumatic pericarditis, and traumatic reticulo-peritonitis are the possible health problems which can be caused by the ingestion of foreign bodies by the ruminants (Sastri, 1983). Among these, disease of rumen and reticulum are of great economic importance because of severe losses on productivity of the animals, sometimes leading to death of the animals. Batarseh (1991) reported that in Jordan, the most common foreign bodies found in the grazing ruminants were plastic objectives such as bag and pipes etc. Similarly, reports from different parts of the world have shown that the incidence of ingestion of foreign bodies by domestic ruminants is considerably

high causing poor body conditions and losses in productivity (Blood and Radostits, 1989; Braun *et al.*, 1990; Kato and Yamamoto, 1990; Majeed *et al.*, 1991). The problem also appears to be high in Pakistan but has not yet been documented. The present study was therefore, initiated to investigate the presence of foreign bodies in the reticulo-rumen and its effect on rumen microbial population in buffaloes slaughtered in the Peshawar abattoir.

MATERIALS AND METHODS

Collection of samples

Rumen and reticulum of 320 adult buffaloes were randomly examined at the Municipal Slaughter House, Peshawar. Immediately after slaughtering of the animals, rumen and reticulum were opened and any foreign non dietary materials, found were collected. These foreign bodies were washed with tap water to remove adhering digesta and were brought to laboratory in labeled polythene bags. These were washed once again, wiped with a piece of clean cloth

and dried in a laboratory oven. The materials collected from each animal were separated into different types and their weight were recorded. Plastic objects were further sorted into loose and compact masses and metals were grouped as sharp and blunt.

Representative samples of rumen fluid were collected randomly from 40 buffaloes with or without foreign bodies in reticulo-rumen. The rumen contents were squeezed and the fluid was filtered through a double layer of muslin cloth. An aliquot of 50 ml was transferred to a bottle containing 1 ml 10 N H₂SO₄ and stored at -20°C until analyzed. Microbial-N was determined as trichloroacetic acid precipitable N (Barr *et al.*, 1975). For estimating protozoal population, 4 ml fresh rumen fluid was added to 16 ml Normal-saline solution (8 g NaCl + 100 ml formaldehyde (37%) made to 1000 ml with distilled water) and stored in a bottle at room temperature. Protozoal numbers were counted under a light microscope using a 0.2 mm deep counting chamber (Hawksley, Sussex, England) as described by Habib (1987).

The data on particulars of foreign bodies was analyzed with the Chi-square method and the results on microbial-N and protozoal population in the rumen fluid were analyzed with the analysis of variance procedure described by Steel and Torrie (1981).

RESULTS AND DISCUSSION

Foreign bodies in rumen and reticulum

Among 320 buffaloes, 182 (56.88%) had foreign bodies in their rumen and reticulum. In majority of the buffaloes (49.38%), foreign bodies were found in the reticulum while in 7.5% animals, rumen had such materials. This is in close agreement with the findings of Jagos (1969) who reported that the overall incidence of foreign bodies in adult cows was 51% and that these materials were present in the reticulum in a rumen of 63 and 15% cases, respectively.

As shown in Table 1, the number of foreign bodies found in the reticulum of the buffaloes were greater ($P < 0.05$) than that recovered from the rumen (943 Vs. 58). However, the total weight of the foreign bodies found in the reticulum was less ($P < 0.01$) than that recovered from the rumen (4140.6 Vs 9151.5 g).

Particulars of foreign bodies found in the rumen

Detail of foreign bodies found in the rumen of the buffaloes is given in Table 1 and plates 1 and 2. In buffaloes having foreign bodies on the rumen, plastic constituted major part (62.5%) followed by metallic objects (16.7%). This agrees with the findings of

Ramadan and Mahroose (1984) who in majority of sheep found soft foreign bodies in the form of sags and plastic objects in the rumen. Due to relatively large size, plastic materials are preferentially retained in the rumen and at certain time may cause impaction of the rumen leading to death of the animals. This is substantiated by the findings of Egbe and Chaudhry (1995) who in Nigeria, recovered polythene cloth and ropes from the rumen of cattle, sheep and goats suffering from ruminal impaction. In the present study cloth and rubber pieces were also recovered from the rumen as shown in Table 2 and Plate 2. Such materials occupy large volume of the rumen and would therefore, limit feed consumption by the animal.

Particulars of foreign bodies in the reticulum

Among the 158 buffaloes found positive for foreign bodies in their reticulum, majority ($n=153$; 96.8%) had metals as shown in Table 3. Other materials found in the reticulum included pebbles, marbles, pieces of bones and compact plastic (Plate 3). A total of 766 metal pieces were recovered from the reticulum of 153 buffaloes, out of which 426 (55.6%) were sharp in the form of nails, needles, wires and hair pins (Plate 4). The remaining blunt metals consisted different household items such as keys, coins, iron pieces, rings, bolts and nuts as illustrated in Plate 4. The honey comb like structure of the reticulum was probably instrumental in retaining metal objects. Blood and Radostits (1989) reported that in industrialized countries, metallic foreign bodies may be present in the reticulum up to 90% of normal animals. Among these, sometimes, sharp metallic objects cause perforation of the reticular wall and consequently damage the thoracic viscera, especially heart causing traumatic pericarditis.

Effect of foreign bodies on microbial nitrogen and protozoal number in the rumen fluid

Microbial biomass was estimated by measuring trichloroacetic acid precipitable nitrogen (TCAPN) in the rumen fluid of the buffaloes. No difference in TCAPN was found in the rumen fluid of the buffaloes in the presence or absence of foreign bodies. Mean concentration of TCAPN in the rumen fluid of the buffaloes free of foreign bodies was 35.65 mg/100 ml, which tended to be higher than 30.16 and 26.23 mg/100 ml, estimated in the presence of metals, and plastic in the reticulo-rumen, respectively (Table 4). The difference among the TCAPN means was statistically non significant, apparently due to large coefficient of variation ranging from 31.45 to 49376%. Similarly, protozoal counts in the rumen

fluid also did not show any response ($P > 0.05$) to the presence of foreign bodies (Table 4). Foreign bodies recovered from the rumen and reticulum are assumed undegradable, therefore, these may not directly affect rumen microbial population. However, the physical limitation caused by these objects may reduce both substrate availability to microbes and ingesta kinetics in the rumen. This in turn would negatively affect

efficiency of microbial protein synthesis in the rumen. Studies under control conditions with animals are required to investigate such effects. In the buffaloes, examined in the present study, large variation in type and quantity of feed consumed and interval between sampling and feeding may have contributed to low accuracy in estimating microbial biomass in the rumen.

Table 1: Relative numbers and weights of foreign bodies found in the rumen and reticulum of buffaloes

Particulars	Location of foreign bodies	
	Rumen	Reticulum
Number of buffaloes	24.0	158.0
Particular of foreign bodies		
Total number	58.0	943.0
Average number per buffalo	2.4	6.0
Total weight (g)	9151.5	4140.6
Average weight per buffalo (g)	381.3	26.2

Table 2: Particular of foreign bodies recovered from the rumen of buffaloes

Types of foreign bodies	Positive animals		Particulars of foreign bodies		
	Number	Percent *	Number	Total weight (g)	Average weight (g)
Metals	4	16.7	37	81.3	2.2
Open plastic	8	33.3	8	4435.0	554.3
Compact plastic	7	29.2	7	2111.3	301.6
Nylon cloth	3	12.5	3	2391.0	797.0
Pebbles	1	4.2	2	0.7	0.4
Rubber	1	4.2	1	132.2	132.2

* = percent of the buffaloes harboring foreign bodies in their rumen.

Table 3: Particulars of foreign bodies recovered from the reticulum of buffaloes

Types of foreign bodies	Positive animals		Particulars of foreign bodies		
	Number	Percent *	Number	Total weight (g)	Average weight (g)
Metals	153	96.8	766	1662.0	2.2
Compact plastic	8	5.1	8	1756.1	219.5
Bones	1	0.6	3	13.7	4.6
Pebbles	40	25.3	151	612.0	4.1
Marbles	8	5.1	12	61.5	5.2
Teeth	2	1.3	3	35.3	11.8

Table 4: Concentration of microbial N and population density of protozoa in the rumen fluid of buffaloes in the present or absence of foreign bodies in the reticulo-rumen

Foreign bodies	Microbial - N (mg/100 ml)		Protozoa numbers ($\times 10^3$ /ml)	
	Mean \pm SE	CV %	Mean \pm SE	CV %
Nil	34.29 \pm 5.74	44.33	7.53 \pm 1.54	76.64
Metals	30.57 \pm 2.78	42.75	7.92 \pm 1.31	72.05
Plastic	30.79 \pm 4.44	40.78	5.79 \pm 1.24	52.56
	Non significant		Non significant	

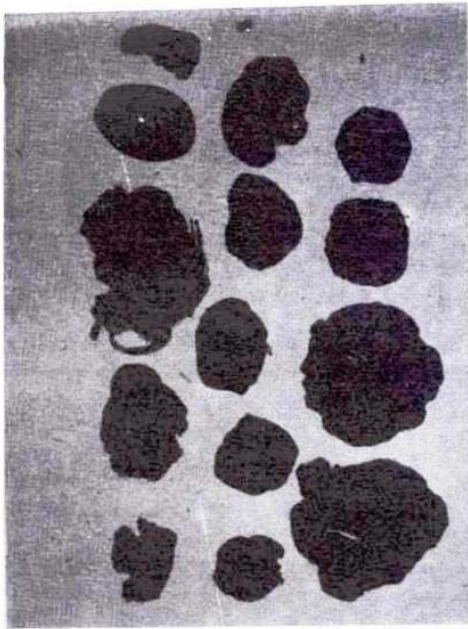


Plate 1: Compact plastic materials recovered from the rumen of slaughtered buffaloes.

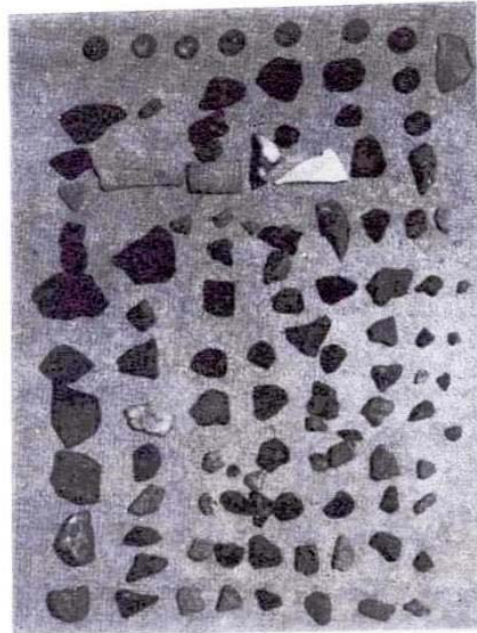


Plate 3: Pieces of stones, bones and marbles recovered from the reticulum of slaughtered buffaloes.

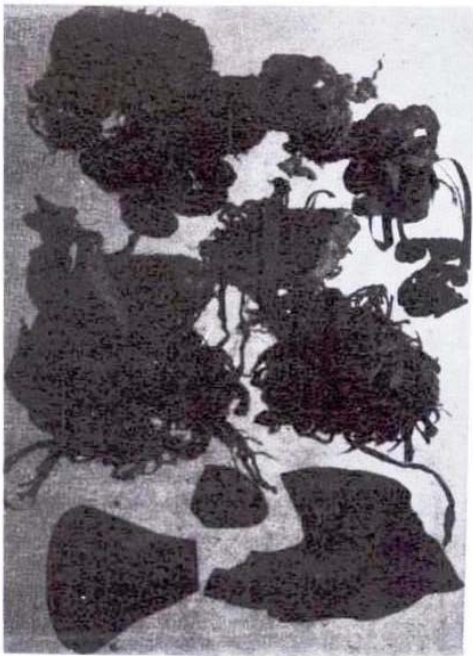


Plate 2: Pieces of ropes and rubber found in the rumen of the slaughtered buffaloes.

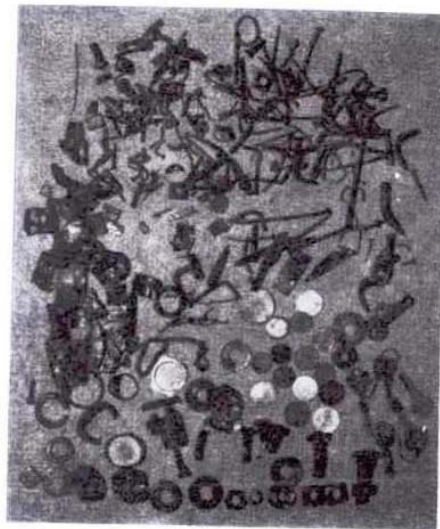


Plate 4: Metallic objects recovered from the reticulum of slaughtered buffaloes.

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