

Research Article

Studies on Foreign Body Ingestion and their Related Complications in Ruminants Associated with Inappropriate Solid Waste Disposal in Gondar Town, North West Ethiopia

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Abstract: A cross-sectional study was carried out in Veterinary Clinics, Gondar town, Ethiopia from November 2011 to April 2012. Totally 416 ruminants were recorded in the clinics in which 36 clinical cases (34 bovine and 2 sheep) were operated for rumen problem. The overall prevalence of foreign bodies' was 8.6%. The non-penetrating foreign bodies have higher prevalence than penetrating foreign bodies. The commonly recovered non-penetrating foreign bodies were plastics (36.6%), followed by sack thread (26.8%), rope (16.9%), leather (15.5%) and hair (4.2%). The penetrating foreign bodies were wires (51.9% commonly occurred), followed by nail (37.0%) and needles (11.1%). The common clinical symptoms observed were recurrent bloat (34.8%), suspended rumination (17.4%), scanty feces (10.9%), anorexia (8.7%), rough hair coat (6.5%) and distended abdomen (21.7%). Outcome of this rumenotomy studies were significantly associated with relation to the quantities of foreign bodies recovered. Out of 36 animals operated 24 were well recovered, 4 faced postoperative complication and 8 died. Adult female animals were more affected than younger and male. 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. In conclusion, detection of the foreign bodies in fore stomach suggested as health risk to ruminants. Therefore, appropriate solid waste disposal system need to implement in the study area to prevent health risk of ruminants and also to protect the environment.

Keywords: Environmental pollution, foreign bodies, indigestion, rumenotomy, ruminants

INTRODUCTION

Environmental pollution is one of the growing problems for grazing animals due to absence of recycling industries, cleaning of environment cultures, improper disposal of plastic bags; free grazing animals eat plastic bags especially in towns and villages. These plastic bags are indigestible and their accumulation in the rumen of grazing animals may lead to adverse effect on health (Ghurashi *et al.*, 2009); plastic bags resist to biodegradation and pollute for decades and centuries and pose great risk to human health and environment (Ramaswamy and Sharma, 2011). Ruminants are notorious for ingestion of foreign bodies related to nutritional deficiencies and feeding management of the animals. They are the root causes for various problems in different organs of the animals (Kahn *et al.*, 1999). The entry and migration of foreign bodies through the body tissues lead to many complications based on nature of the foreign body entrance into the tissues

(Calfee and Manning, 2002). Reports from cattle and sheep reared in urban and sub-urban environments indicates that impaction of rumen from the accumulation of foreign bodies, such as plastic bags causes interference with the flow of ingesta leading to distention of rumen and absence of defecation (Abdullahi *et al.*, 1984; Igbokwe *et al.*, 2003; Remi-Adewunmi *et al.*, 2004). Adult dairy cattle are most commonly affected because of their more exposure (Radostits *et al.*, 2007).

The bovine fore stomach are affected highly due to ingested foreign bodies which are the subject of attention almost all over the world and also major economic importance due to severe loss of production and production ability and sometimes death of the animal (Ramprapbhu *et al.*, 2002). The ingestion and lodgment of foreign bodies are common in the bovine primarily due to indiscriminate feeding habits. In addition, industrialization and mechanization of agriculture have further increased the incidence of

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foreign bodies in these animals (Semieka, 2010). Ingestion of foreign bodies in cattle is common especially in developing countries where the standard of animal management is unsatisfactory (Misk *et al.*, 1984). Animals with nutritional deficiencies may also ingest various types of foreign bodies deliberately. The indiscriminate feeding habits and mineral deficiency makes them susceptible to inadvertent ingestion of foreign materials. Rumen impaction due to plastics, ropes and leather in the rumen leads to anorexia, decreased production and progressive loss of body condition (Tyagi and Singh, 1993).

Clinical rumen indigestible foreign body impaction is characterized by pale mucous membrane, reduction of milk yield, complete cessation of rumination, impacted rumen, atony, reduced rumen motility, feces become scant and inappetance (Vanitha *et al.*, 2010). The most common symptoms observed in animals with plastic bags were bloat and were exhibited by the abnormal bulging of the paralumbar fossa on the left side of the abdominal wall (Ramaswamy and Sharma, 2011).

In Ethiopia, small ruminants are kept under an extensive type of management are likely to be exposed to the ingestion of indigestible garbage from various sources due to a wide spread environmental contamination with plastic bags, absence of policy to protect environment and frequent occurrence of drought that predispose animals to nutritional deficiency and pica (Abebe and Nuru, 2011). Many efforts were made to study infectious disease prevalent in the country, however, solid environmental pollution (Foreign Body's) have been given lesser attention to be treated as a separate health problem. Therefore, present study was undertaken to find out type of foreign body ingestion and their related complications in ruminants associated with inappropriate solid waste disposal in Gondar town, North West Ethiopia.

MATERIALS AND METHODS

Study area: The study was conducted at Gondar city which is the capital of North Gondar zone in Amhara regional state, Ethiopia. It is situated between 12°36'N and 33°28'E at an altitude of about 2300 m above sea level with an average temperature of 20°C and an average annual rainfall of 1800 mm. According to Zonal Office of Agriculture and Rural Development (CSA, 2008) the livestock population in the area comprises of cattle (8,202), goat (22,590), sheep (2,695), horse (1,065) and donkey (9,001).

Study animals: The study was conducted on 416 ruminants coming to private and Gondar University Veterinary Clinic in Gondar town with some complications. Among them 36 were selected for rumenotomy based on the clinical manifestation and history of ruminant about their health status and vital parameters were taken during clinical examination.

Study design: A cross-sectional study was carried out at private and Gondar University Veterinary Clinic in Gondar town to assess the prevalence of fore-stomach foreign bodies, identification on type of foreign bodies, common clinical signs of foreign bodies affected animals and effectiveness of rumenotomy as a treatment method adapted from November 2011 to April 2012. The study animals were selected by purposive sampling method and sampling was taken by non-probability sampling technique (Thrusfield, 2005). Species, sex, age group, management system and breed are considered as risk factors for the occurrence of foreign bodies. The rumenotomy was carried out as per standard procedure. The removed foreign bodies were segregated as penetrating and non-penetrating then weighed accordingly. The personal observation also conducted to see the present situation of solid environmental pollution in the city.

Methodology: After taking history, clinical sign and vital parameters, the presence of foreign body in the bovine and sheep was diagnosed by external abdominal palpation and confirmed later by rumenotomy. During the study period ruminants were treated with conservative treatment for 3-5 days and if there is no marked improvement occurred by this time, they were considered for rumenotomy. The foreign bodies were removed from the rumen of cattle surgically by performing rumenotomy (Fig. 1b to f) under local anesthesia using lidocaine 20-30 mL by infiltration along the line of incision. For the excited and non cooperative animals xylazine (0.1 mg/kg, I/M) was given as sedative before surgery.

Data analysis: The data collected from the studies were entered and managed in Microsoft Excel Work Sheet and SPSS. The analysis was conducted by using Stata version 15. Prevalence of individual foreign bodies was expressed as percentage by dividing number of each positive foreign body to the total number of positive foreign bodies obtained. The significant differences in prevalence and different risk factors were determined by using Fishers exact test. The statistical significance was considered at 5% level ($p < 0.05$).

RESULTS

Pollution in study area: The solid environmental pollution in the study area of Gondar town has been observed personally. Plastic bags (known as festal in Amharic language) are commonly used as storing wastes, shopping bags, packaging food and other items in Gondar city. Majority of the residents have collect their household wastes including plastics with domestic waste in sacks which is locally called 'medaberia' and place them at the road side until it is carried away by waste collectors of the city. Solid wastes are commonly observed near road side, river side, in drains and



Fig. 1: Rumenotomy conducted at Gondar veterinary clinic, Gondar, Ethiopia

Table1: The overall prevalence of foreign bodies in ruminants

Ruminants taken for study	Numbers of animals observed	Types of foreign bodies observed	
		NPFBs	PFBs
Cattle	250	70 (16.8%)	27 (6.5%)
Sheep	154	01 (0.2%)	00
Goats	012	00	00
Total	416	71 (17%)	27 (6.5%)

Table 2: Prevalence of penetrating and non-penetrating foreign bodies found in the ruminant stomach

Total number of foreign bodies recovered	Foreign bodies observed	Management system		p-value
		Intensive	Semi-intensive	
27	Wire	3 (11.1%)	11 (40.7%)	0.2
	Needle	0	03 (11.1%)	0.3
	Nail	2 (7.4%)	08 (29.6%)	0.3
71	Plastics	9 (12.7%)	17 (23.9%)	0.5
	Sack thread	7 (9.9%)	12 (16.9%)	0.4
	Leather pieces	5 (7.0%)	06 (4.5%)	0.2
	Rope	5 (7.0%)	07 (9.9%)	0.4
	Hair	0	03 (11.1%)	0.2

Table 3: Prevalence of penetrating and non-penetrating foreign bodies in ruminants' stomach in association with species

Total number of foreign bodies recovered	Foreign bodies observed	Species observed		p-value
		Bovine	Ovine	
27	Wire	14 (51.9%)	0	0.4
	Needle	03 (11.1%)	0	0.8
	Nail	10 (37.0%)	0	0.5
71	Plastics	25 (35.2%)	1 (1.4%)	0.4
	Sack thread	19 (26.8%)	0	0.2
	Leather pieces	11 (15.5%)	0	0.4
	Rope	12 (16.9%)	0	0.4
	Hair	3 (4.2%)	0	0.8

public places. Starting from the temporary and final waste disposal sites, the stray and other domestic animals like cattle engulf these plastic bags containing food materials (Fig. 1a).

Prevalence: The overall prevalence of foreign bodies was 8.6% (n = 416). From the foreign bodies, 27 (6.5%) and 71 (17%) were Penetrating Foreign Bodies (PFBs) and Non-Penetrating Foreign Bodies (NPFBs) respectively. The non-penetrating foreign bodies have higher prevalence than penetrating foreign bodies (Table 1).

Foreign bodies in ruminants: In general, Penetrating Foreign Bodies (PFBs) found in the ruminant stomach were wire, nail and needle (Table 2). Among the PFBs, wire was dominant PFBs (51.8%), followed by nail (37.0%) and needle (11.1%). The types of Non-Penetrating Foreign Bodies (NPFBs) observed from the study was leather, hair, plastic, rope and sack thread (Fig. 1e). The most commonly observed NPFBs was plastics (36.6%) followed by sack thread (26.8%), rope (16.9%), leather (15.5%) and hair (4.2%) (Table 3). The presence of PFBs and NPFBs was observed from the animals managed by intensive and semi-intensive system. Both PFBs and NPFBs were predominantly observed in semi-intensive system compared to intensive system. Among the three penetrating foreign bodies observed, wire was the dominant PFBs (40.7%) compared to needle and nail in semi-intensive

management system. All the wire, needle and nails observed from the study have no significant association with management systems ($p > 0.05$). Among the four NPFBs observed in the study, plastics were found to be dominant in semi-intensive management system. The NPFBs like plastic, sack thread, rope and hairs also have no statistically significant association with management systems ($p > 0.05$). However, these FBs frequently occurred in semi-intensive management system than intensive management system.

Foreign bodies in association with species: The PFBs and NPFBs were observed from bovine and ovine species. The results revealed that among the three PFBs, maximum of 51.9% were wires compared to needle (11.1%) and nail (37.0%) in bovines (Table 3). There is no case with PFBs in ovine. Among the 71 observations of NPFBs, plastics were the dominant one in bovine compared to other foreign bodies. In ovine species only one animal (1.4%) was found to have plastic and the remaining animals there were no NPFBs. The number of animals in bovine and ovine species which contains plastic was subjected to Fisher exact test analysis and the result was statistically not significant ($p > 0.05$).

Foreign bodies in relation with sex: Among the PFBs, wire was observed at the maximum of 40.7% in female animals compared to male (Table 4). There was no statistically significant association ($p > 0.05$) in the frequency of occurrence among the PFBs. Among the

Table 4: Prevalence of penetrating and non-penetrating foreign bodies in ruminant stomach in relation to their sex

Total number of foreign bodies recovered	Foreign bodies observed	Sex		p-value
		Male	Female	
Penetrating foreign bodies				
27	Wire	3 (11.1%)	11 (40.7%)	0.3
	Needle	3 (11.1%)	00	0.6
	Nail	2 (7.4%)	08 (29.6%)	0.4
Non-penetrating foreign bodies				
71	Plastics	3 (4.2%)	23 (32.4%)	0.4
	Sack thread	4 (5.6%)	15 (21.1%)	0.2
	Leather pieces	1 (1.4%)	10 (14.1%)	0.5
	Rope	2 (2.8%)	10 (14.1%)	0.5
	Hair	0	03 (4.2%)	0.6

Table 5: Prevalence of penetrating and non-penetrating foreign body in relation with breeds

Total number of foreign bodies recovered	Foreign bodies observed	Breeds		p-value
		Local	Cross	
Penetrating foreign bodies				
27	Wire	6 (22.2%)	8 (29.3%)	0.5
	Needle	0	3 (11.1%)	0.1
	Nail	5 (18.5%)	5 (18.5%)	0.3
Non-penetrating foreign bodies				
71	Plastics	9 (12.7%)	26 (36.6%)	0.3
	Sack thread	8 (11.3%)	11 (15.5%)	0.5
	Leather pieces	4 (5.6%)	7 (9.9%)	0.6
	Rope	5 (7.1%)	7 (9.9%)	0.5
	Hair	0	3 (4.2%)	0.2

Table 6: Prevalence of penetrating and non-penetrating foreign body in relation with age groups

Total number of foreign bodies recovered	Foreign bodies observed	Age groups		p-value
		Young	Adult	
Penetrating foreign bodies				
27	Wire	0	14 (51.9%)	0.4
	Needle	0	03 (11.1%)	0.8
	Nail	0	10 (37.0%)	0.5
Non-penetrating foreign bodies				
71	Plastics	1 (1.4%)	26 (36.6%)	0.1
	Sack thread	0	19 (26.8%)	0.2
	Leather pieces	0	11 (15.5%)	0.5
	Rope	0	12 (16.9%)	0.4
	Hair	0	02 (2.8%)	0.2

NPFBs, plastics (32.4%) and sack threads (21.1%) were commonly noticed in females than in male animals. In the present study the hairs were not recovered from the males but 4.2% of the female bovines' hairs were found. The presence of NPFBs like plastic, sack thread, leather, rope and hairs have no significant association with sex of the animals ($p > 0.05$).

Foreign bodies in association with breeds: The prevalence of PFBs and NPFBs problems in the rumen and reticulum of local and cross bred animals were studied (Table 5). The PFBs such as wire and nails were found in both local and cross breeds. The needles were obtained only in cross bred animals (11.1%). Moreover, comparatively cross breed animals are more exposed for indigestible foreign bodies than local breeds and have not shown any statistical significance. The NPFBs were also found in local and cross breed. Among the various NPFBs plastics was the dominant (36.6%) one in cross breed compared to other foreign bodies observed.

Foreign bodies in relation with age groups:

Frequency of foreign bodies' occurrences in the ruminant stomach results revealed that PFBs were found at the maximum of 51.9% followed by nail (37.0%) and needles (11.1%) in adults. Among the NPFBs, plastics were found at the maximum of 36.6% compared to other foreign bodies in adults. The data of NPFBs were statistically not significant ($p > 0.05$). In general adult animals were more affected than young animal (Table 6).

Quantities of foreign bodies: Outcome of rumenotomy is highly significant association with relation to the quantities of foreign bodies recovered ($p = 0.00$). When ruminants are ingesting large amount of foreign bodies the chance of the animal collapsing after surgery is greater. As shown in Table 7, out of 36 ruminants operated, 28 (77.8%) were recovered and 8 (21.1%) died. The quantities of foreign bodies obtained from the ruminant stomach were varied from 0.75 to 9 kg (Table 7).

Table 7: The quantity of foreign bodies obtained from the rumen and reticulum of ruminants

Final out put	Total number of animals	Quantities of FBs recovered		
		0.75-2 kg	5-9 kg	>9 kg
Recovered	28	8 (22.2%)	19 (52.8%)	1 (2.8%)
Dead	08	-	-	8 (22.2%)
Total	36	8 (22.2%)	19 (52.8%)	9 (25%)

p = 0.00

Table 8: Commonly observed clinical signs among the animals associated with foreign bodies

Symptoms	Frequency of occurrence	Percentage of animals affected
Scanty feces	05	10.9
Recurrent tympany	16	34.8
Anorexia	04	8.7
Suspended rumination	08	17.4
Rough hair coat	03	6.5
Distended abdomen	10	21.7

Table 9: Status of animals after the completion of rumenotomy during the year 2011-12

No of animals recovered	Uneventfully recovered animals	No animals with post operative complications		
		Sure abscess	Wound dehiscence	Local peritonitis
28	24 (85.7%)	1 (3.6%)	2 (7.1%)	1 (3.6%)

Common clinical signs: 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 34.8, 17.4, 10.9, 8.8, 6.5 and 21.7%, respectively (Table 8).

Status of animals after rumenotomy: The rumenotomy was performed on 36 animals at different Veterinary Clinics in Gondar town during the year 2011-12. Among the 36 animals operated, 8 died and 28 were recovered in which 4 developed post-operative complications such as suture abscess (3.6%), wound dehiscence (7.1%) and local peritonitis 1 (3.6%) at the surgical site within a week after performing surgery. These problems were solved by ventral drainage and antibiotic administration (Table 9).

DISCUSSION

Prevalence of foreign body ingestion such as plastic bags and other indigestible materials found in ruminants could pose serious health problem among free grazing animals (Abebe and Nuru, 2011). The solid environmental pollution in the study area are plastic bags commonly used as storing wastes, shopping bags, packaging food and other items. Starting from temporary to final waste disposal sites, the stray and other domestic animals like cattle engulf these plastic bags containing food materials as the owners allow the animals for free grazing. To support current observations Singh (2005) stated that the owners allow their cows and virtually push them out of shelters to find food available in dumps of debris lying around the city. Stray cows are generally seen on the road sides eating away the plastic bags and their contents (Fig. 1a) in search of food items.

The present study indicates that an overall prevalence of 8.6% was a problem of foreign bodies in

ruminants. This level of prevalence of foreign bodies is significant to affect the health of the study animals. In Jordon, Ismail *et al.* (2007) reported that 77% cases of adult dairy cattle suffering from recurrent tympany had indigestible foreign bodies and Radostits *et al.* (2007) showed the prevalence of 16% in a similar work. The non-penetrating foreign bodies were detected at higher frequency, compared to penetrating foreign bodies. This might considered as a result of their availability to be ingested by the study animals from their grazing environment. The presence of penetrating and non-penetrating foreign bodies observed mainly in semi-intensive system. In semi intensive production system animals have a chance of exposure to waste disposal materials as they are grazing freely around the road side. These findings are partially agreement with Ducharme and Fubini (2004); they have reported that wires account for approximately 70% of ingested foreign bodies and nails and steel objects make up the other 30%. Ismail *et al.* (2007) and Khan (2005) indicated that nails and wires were found in the reticulum. Haword (1986) also found that wires and nails being the most common inciting agents. This may be due to the animals exposed to construction site or to deteriorating buildings and fences.

In the present study non-penetrating foreign bodies such as leather, hair, plastic, rope and sack thread were observed. Present findings are in corroboration with the report of Roman and Hiwot (2010) and Igbokwe *et al.* (2003); as they have also found plastic bags, rope, hair, leather in their study. This similarity may be due to the environment polluted by the same type of waste materials. The results of this study further indicate that plastics were the most commonly observed non-penetrating foreign body in the rumen. This finding is in agreement with Kahn *et al.* (1999); they have reported that in buffaloes having foreign bodies on the rumen, plastic constituted major part. In addition, Roman and Hiwot (2010) indicated that plastic bags

were recovered as the most common foreign bodies. Bakhiet (2008) also suggested that the most common foreign body in sheep in Sudan is plastic bags and a clean-up of the environment will sub-statically reduce foreign body-pica syndrome in sheep. Singh (2005) recorded that 95% of urban stray cattle in India are suffering from various ailments due to hazardous materials inside their abdomen, out of them 90% are plastic bags. This might be due to these materials used for storing wastes, shopping bags and packing food items and disposed everywhere after using, hence they were eaten by the free grazing animals especially more in towns and villages.

The incidences of ingestion of foreign bodies were low in sheep compared to cattle. Similar findings were observed by Radostits *et al.* (2007). They have reported that sheep and goats ingest fewer amounts of foreign bodies. This may be due to lack of oral discrimination by cattle which leads to the ingestion of foreign bodies, whereas ovines have discriminate feeding habits. Hence, the incidence of foreign bodies' ingestion is less in ovine compared to that of bovines. This is in agreement with the report of Bakhiet (2008) and Smith (2002).

In the present study wires have higher frequency of occurrence followed by plastics and sack threads in females 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 sheep and goats 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 the present study the prevalence of penetrating and non-penetrating foreign body problems in the rumen and reticulum was greater in cross bred animals than local breeds. This may be due to the introduction of the Holstein Friesian cross bred cows though they are producing more milk, due to their massive size they need large quantity of feed as compared to the local ones. The farmers are not in a position to feed them adequately as they need so; these animals faced nutritional deficiency and developed pica behaviors which obviously lead to the consumption of all sorts of foreign bodies, they come across in the grazing and other areas.

The frequency of occurrences of foreign bodies in the ruminant stomach was higher in adult animals than

young. Radostits *et al.* (2007) also reported adult dairy cattle are most commonly affected because of their more frequent exposure. Howard (1986) reported that most cases occurred in animals over two years of age. The occurrence is likely due to differences in feeding practices between adult and young stock and increased exposure occurring over time. Igbokwe *et al.* (2003) and Roman and Hiwot (2010) have recovered those plastics, ropes, leather and papers from the rumen of older goats and sheep slaughtered at Abattoir.

In this study, ruminants ingested large amount of foreign bodies collapsed even after surgery. 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 the rumen resulted from the accumulation of foreign bodies such as plastic bags interfered with flow of ingesta leading to the distention of rumen and consequently impairs the digestion process.

In the present study, the outcome of rumenotomy was highly significant association with the quantities of foreign bodies. The quantity of foreign bodies obtained from the ruminant stomach was varied greatly. This difference may be due to the study area difference and duration of the animals brought to clinic for treatment as well as the type of foreign bodies ingested. Ismail *et al.* (2007) revealed that the presence of large amounts (4-14 kg) of non-metallic foreign bodies consisting of plastic materials and ropes on the basis of history and clinical examination tentatively diagnosed as cases of ruminal impaction and confirmative diagnoses were carried out by the exploratory rumenotomy.

The most commonly observed clinical symptoms during the study period include recurrent bloat suspended rumination, scanty feces, anorexia and rough hair coat and distended abdomen among animals affected by foreign bodies in descending orders. These results are in agreement with the studies conducted by Tyagi and Singh (1993), however the percentage of foreign bodies found in their work, such as recurrent bloat and scant feces was dissimilar.

Among the 36 rumenotomies performed during the study period (November 2011 to April 2012) 28 (77.7%) animals were recovered. Ismail *et al.* (2007) observed similar result that 77% of the cows completely recovered and returned to normal production levels according to owner's expectations. Among the 28 recovered cows, 4 cows developed postoperative complications like suture abscess, wound dehiscence and local peritonitis at the surgical site within a week after performing surgery. These problems were solved by ventral drainage and antibiotic administration. It is agreed with Sanni *et al.* (1993) they have reported that the commonest complications were wound dehiscence, peritonitis and hemorrhage. The postoperative surgical complications were due to poor health status animals

used, broken asepsis during surgery, wrong use of instrument, poor surgical techniques and dirty pens which they were kept after surgeries.

In conclusion, pollution by polythene bags should be strictly avoided and allowing animals in polluted grazing land should be evaded. The ruminants' owners may be advised not to allow their ruminants to freely wander in streets especially in the cities and as much as possible to prevent nutritional deficiencies (Ramaswamy, 2010; Ramaswamy and Sharma, 2011). Present study also agreed with this conclusion.

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