

A survey on frequency and kinds of foreign objects of rumen and reticulum and reticular adhesion in cattle slaughtered in Khorramabad abattoir

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Abstract

Traumatic reticuloperitoniti (TRP) is common diseases of cattle. Perforating wall of reticulum by external and sharp objects often leads to Peritonitis and can cause conflicts with other members. Disease due to sharp decline in cattle production and high mortality rate has great economic importance. The purpose of this study was checking possibility of presence external objectives and its kinds in apparently healthy cattle that brought to slaughterhouses of Khorramabad to slaughter. In addition, existence adhesion of reticular was researched too. This study was conducted on 2,400 cows in three months (February 2014 to May of 2014). Cattle of both sexes (male and female) were selected and divided to four age groups (under 2 years, 2-4 years, 4-6 years and top of 6 years old). Adhesion of reticular was observed in 896 under reviewed cows. Statistical analysis shows differences between two sexes and different age groups of adhesion existence ($p < 0.01$). There were external objects in rumen and reticulum of 1500 cows (%62.5), while 186 pieces metal external objects had perforated wall of reticulum of 165 cows. A significant difference was observed between two sexes and different age groups, based on presence of external objects ($p < 0.01$). Also, relationship between adherence and presence of external objects in under reviewed cows was meaningful ($p < 0.01$).

Key words: external objects, cow, reticulum, adhesion, slaughterhouse. © 2015 BBT Pub. All rights reserved.

Introduction

Traumatic reticuloperitoniti (TRP) is common diseases of cattle. Trophic behavior of cow, dispose it for accidental devour external objects including metal external objects. Complication of devouring external objects is cases that cause important economic damage to ranch industrial every year and it is considered well in veterinarian studies. It is possible that external objects go into reticulum, when set in it and cause local or general inflammation of peritoneum and diaphragm, involvement of pericardium and myocardium, liver, spleen, lungs and other organs nearby (5, 9) also make some diseases in livestock by causing peritonitis, pericarditis, indigestion caused by vague nerve, diaphragmatic hernia etc. that an efficient treatment and can be found for them in most cases. Side effects of ingested external objects is not just about influence type, also Non-intrusive external objects can cause gastrointestinal dysfunction influence. It will be happened by various ways include destructing phlegm or blocking channel of reticulum-omasum. Various conditions are known as disposed factors of devouring innutritious objects that low attention and no-awareness about principles of feeding and safe of livestock are the most important factors. Pica will appear in low innutritious condition and animal likes external objectives. Ranchers' carelessness in collecting external objects from place of keeping animals or near of it and feeding animal in such places or places near urban rubbishes are other effective and dangerous factors that should be considered. The symptoms include fever, anorexia, decreasing movement of tripe, animal moans while on the move, refusing to move uphill, mild bloating, away anterior limbs from each other, losing weight, changes in foreign coverage to harsh conditions and above all of a sudden sharp decline in milk (till %90). Laboratory findings in these livestock are including increasing number of white blood cells (neutrophils), total protein and fibrinogen (1, 9, and 11). Use of diagnostic imaging techniques (X-rays) can be useful in detecting external objects in reticulum (7). Usual treatment of livestock along with above-mentioned complications includes supportive care, antibiotics, rumenotomy and feeding magnet. Collect and remove sharp external objectives from manger of cattle, use of large magnets in food preparation steps in order to minimize the possibility of the presence of metal objects in animal feed and feed magnets, proportional to weight and age of the animals for placing in reticulum are basic principles of prevention and control this infection (5,9, 11). What is the review of texts and articles be obtained it is that most known content related to complications of swallowing foreign bodies, have devoted to cattle and there is brief information about these effects in other ruminants that it shows importance of this disease in cattle. The purpose of this study is studying disorders of swallowing external objects in cattle of Khorramabad .For this reason, a lot of foreign objects (number and type), the location and condition of the stomach of cattle troughs or free them slaughtered in Khorramabad is studied .While adhesion of reticular to adjacent organs is also of interested.

Materials and Methods

To perform this study, totally 40 times was referred to slaughter of Khorramabad from 20.02.2014 till 20.05.2014 and 2400 slaughtered cattle (1,300 male and 1,100 female) were evaluated. In each case, age of animals were determined from the dental formula except registration of sex and thus, livestock divided into four groups: younger than 2 years , 4-2 years , 6-4 years and more than 6 years were.

Detection of Adhesion

After slaughter livestock and opening abdominal cavity and before ejecting elimination and guts presence or absence of adhesion between reticular and adjacent organs was determined by guiding hand through anterior abdominal.

Check Walls and Contents of Reticular: after opening pre-stomach, at first inner wall and reticular content for the presence of external objects (Penetrating and non- penetrating) was examined and number, type and size of external objects was recorded in each case.

Check Contents of Rumen: rumen contents were removed by hand after the initial inspection was upside down. In addition, in this stage, number, type and size of external objects was obtained and recorded.

Statistical Calculation Methods: obtained data was analyzed by SPSS software and relationship between adhesion and gender, age, also, relationship between adhesion and external objects also, relationship between external objects and age and gender was analyzed.

Results

1-Adhesion: in this study it was cleared that 896 cows (%37.33) has adhesion. It should be noted there was seen a reticular and pericardium adhesion to diaphragm in an eight- year-old female cow.

Adhesion and Gender: amount of adhesion was 27/53 percent in female cows (586 Ross) and 85/23 percent in fame cows (310 Ross). Statistical analysis considers relationship between two sexes statistically significant ($p < 0.01$) (Table 1).

Adhesion and Age: as Table 2 shows, amount of adhesion in age group under 2 years, 2-4 years, 4-6 years and 6 years and up was 5 percent (26 Ross), 26.15 percent (183 Ross), 46.98 percent (296 Ross) and 65.17 percent (391 Ross) respectively. Meanwhile, differences between these four groups was statistically significant ($p < 0.01$) (Table 2).

2- External Objects: totally, 2400 cows were analyzed that 1500 Ross (%62.5) had external objects and 900 Ross (%37.5) didn't have it. Metal object was seen in 746 Ross cows and nonmetallic object was seen in 813 Ross cows. Among 746 Ross cattle in which metallic external objects were found, it had penetrated into reticular in 165 Ross cow (Table 3).

External Objects and Gender: there wasn't any external object in rumen and reticulum of 780 Ross cows of 1300 studied cows. While, there was metallic and nonmetallic external object in 256 and 292 Ross male cows respectively (Table 3). Meanwhile external object penetrated into reticulum of only one Ross of male cows. 120 Ross female cows had external objects and 980 Ross didn't have it. There was metallic and nonmetallic external object in 490 and 521 Ross male cows respectively. External object penetrated into reticulum of 164 Ross of male cows. Performing statistical test showed relationship between presence of external object and gender ($p < 0.01$).

External Objects and Age: table 4 shows condition and type of external objects in several age groups. In age group No. one, 85 Ross cows had external objects and 435 Ross didn't have it. Metal object was seen in 30 Ross cows and nonmetallic object was seen in 63 Ross cows. Among cattle of this age group, metallic external object had penetrated into reticular in 1 Ross cow. In age group No. two, 343 Ross cows had external objects and 307 Ross didn't have it that among them, metal object and nonmetallic object was seen in 175 and 189 Ross cows respectively. Metallic external object had penetrated into reticular in 32 Ross cow of this group. In age group No. three, 508 Ross cows had external objects and 122 Ross didn't have it. Metal object and nonmetallic object was seen in 245 and 278 Ross of these cows respectively. Metallic external object had penetrated into reticular in 63 Ross cow of this group. In age group No. four, 564 Ross cows had external objects and 36 Ross didn't have it. Metal object and nonmetallic object was seen in 296 and 283 Ross of these cows respectively. Metallic external object had penetrated into reticular in 69 Ross cow of this group. Following notes are considerable in relationship between age and external object, metallic objects, nonmetallic objects and metallic objects which has penetrated into reticular:

-Relationship among presence of external objects was significant in several age groups ($p < 0.01$).

-There was no significant difference in terms of presence non-metallic external material between any of the age groups whilst in the presence of metal objects; significant difference was observed between the different age groups ($p < 0.01$).

- According to penetrate metallic objects; there was significant difference between group four and other three age groups ($p < 0.05$).

Relationship between Presence of metal Objects and Adhesion: the conducted research shows that among 896 cows with reticular adhesion, 384 cows had metal object in this body. In other word, among 630 cows with metal objects in reticulum, 384 Ross showed reticular adhesion. Statistical study showed that relationship between presence of adhesion and metal objects in reticulum is very significant ($p < 0.001$).

The Number and Types of Found External Objects: several kind non-metal external objects including capillary hub, fabric, bags, gloves, hose, and rope and plastic materials were removed from proventriculitis of 813 under study cows. Among 874 founded metal pieces, nail with 358 number and wire with 317 pieces have had the most number of metal objects. 186 pieces of metal objects were penetrated into reticulum. There was considerable of sand, gravel and grit in reticulum of 137 Ross of studied cows.

Number and Permeability of Different Types of Founded Metal Objects: among 116 metallic pieces which was found in rumen, none of them has penetrated into this body, while among 758 founded metal pieces in reticulum, 80.61% of needles, 31.68% of nails and 10.76% of wires were penetrated into this body (Table 5).

Table 1: Number and percent of adhesion in male and female animals

Total	Condition of Reticulum		Gender
	free	adhesion	
1300(54/17%)	990(76/15%)	310(23/85%)	male
1100(45/83%)	514(46/73%)	586(53/27%)	female
2400(100%)	1504(62/67%)	896(37/33%)	total

Table 2: Number and percent of adhesion in various age groups

Total	Condition of Reticulum		Age (year)
	free	adhesion	
520(21/67%)	494 (95%)	26(5%)	2<
650(27/08%)	467(71/85%)	183(28/15%)	2-4
630(26/25%)	334(53/02%)	296(46/98%)	4-6
600(25%)	209(34/83%)	391(65/17%)	6>
2400(100%)	1504(62/67%)	896(37/33%)	Sum

Table 3: Number and percent of existence or no-existence external object and types of it in pre-stomach of under-review cattle base on gender

Total quantity	existence external object			no-external object	Gender
	Total	No-metal	Metal		
1300(54/17%)	520(40%)*	292(22/46%)	256(19/69%)	780(60%)	Male
1100(45/83%)	980(89/1%)**	521(47/36%)	490(44/55%)	120(10/9%)	Female
2400(100%)	***1500(62/5%)	813(33/88%)	746(31/1%)	900(37/5%)	Sum

*28 male animals had metal object, either no-metal object.

**31 female animals had metal object, either no-metal object.

**** 59 under reviewed animals had metal object, either no-metal object.

Table 4: Number and percent of existence or no-existence external object and types of it in pre-stomach of under-review cattle based on age

Total quantity	with external object			without external object	Age(year)
	total	No-metal	Metal		
520(21/67%)	85(16/35%)*	63(12/12%)	30(5/77%)	435(83/65%)	2<
650(27/08%)	343(52/77%)**	189(29/1%)	175(26/92%)	37(47/23%)	2-4
630(26/25%)	508(80/63%***	278(44/13%)	245(38/88%)	122(19/37%)	4-6
600(25%)	564(94%***	283(47/17%)	296(49/33%)	36(6%)	6>
2400(100%)	1500(62/5%)****	813(33/88%)	746(31/1%)	900(37/5%)	Sum

*in 8 animals had metal object, either no-metal object.

**In 21 animals had metal object, either no-metal object.

**** In15 animals had metal object, either no-metal object.

*** In 59 under reviewed animals had metal object, either no-metal object.

Table 5: Animals with penetrance condition and all kinds of intrant, found and under reviewed objects

wire	nail	needle	Intrant metal object penetrance condition
199(89/24%)	179(68/32%)	19(19/39%)	free
22(9/86%)	27(10/31%)	20(20/41%)	Surface sunken
2(0/9%)	56(21/37%)	59(60/2%)	Deep sunken
223(100%)	262(100%)	98(100%)	Sum

Discussion

It shouldn't be forgotten that the main cause of adhesion of reticular is penetration of sharp external object from this body into abdominal part which causes inflammatory reactions at the site of perforation by moving the flora of the proventriculitis. In this study, 37.33% of studied cows showed reticular of adhesion to surrounding tissues. In the mentioned cow type that the impact damages may be found in 70% of apparently healthy cows (9). During studies of Ahwaz, 11.7% of under study cows showed adhesion in slaughterhouse (3). In this study, relationship between adhesion and gender was significant. Maybe its reason is higher ages of female cows than male types. Also, aging of female cows increases the possibility that this group of cows is exposed to metal objects. In addition, experience of pregnancy and giving birth of this gender increases possibility of penetrating objects and it can

cause adhesion (9). It can be seen that, difference between old cows and young cows were statistically significant (Table 2). It is noteworthy that many researchers believe, increasing age enhance affection TRP and its complications in cows too, and heifers and cows by lesser than 2 years age rarely stricken this disease (9) that this issue consistent with the present research. The results of this study showed that 62.5% of studied cows have had external object which in between; metal objects were found in 31.08% of all cows. It is said that, possibly up to 90% of cows of industrial areas have metal object in their reticulum (9). In similar conducted study on cow in Ahwaz, 32.5% of cows have had external object and 19.2% have had metal external object in their reticulum (3). In Egypt, about prevalence of external objects in ruminants it was announced that external objects are most prevalent between buffs (compared with cow, sheep and goats) (10). It was cleared during a study in state of Punjab in India that among 420 Ross buffaloes that were perished at the age of 2 to 12 years old during 1973 till 1977, the death reason of 88 Ross (about 21%) was external object and death reason of 90 Ross was diaphragmatic hernia (which is usually a complication of external object) (4). In another study on 50 buffaloes suffering from indigestion caused by Vagal nerve, following reasons represented as primary factor of disease (2): TRP in 16 Ross, diaphragmatic hernia in 10 Ross, generalized peritonitis in 3 Ross, abscesses around reticulum in 5 Ross omasum accumulation in 7 Ross, accumulation of rennet in 3 Ross, pericarditis in 3 Ross and liver abscess in one Ross, meanwhile reason of death of two Ross hasn't defined. Paying attention on the above list indicates that in many cases, sharp external object could be the initial cause of indigestion caused by the vagal nerve. In this research, relationship between metallic objects and adhesion was very significant. There is no doubt that possibility of adhesion will increase by increasing quantity of these objects. It should be known that, most of devoured metallic objects stay in the wall of reticulum without any damage to this body. Special form of wall of reticulum and harsh constrictions of this body cause push of acerous object to wall. If created hole don't get serooz, any symptomatic can't be seen and external object stay in its place long time and will be corroded gradually (9). But if external object pass of serooz layer, micro floors inside reticulum permeate trough created hole and cause locality infection. In this condition, tumult reactions will happen (in most conditions), locality infection will create that adhesion can be its complication. Compare table 1 & 5 show that, although there is adhesion in 896 Ross cows, but penetrated external object was found only in 165 Ross cow. In explanation it has said that, after 72 hours of penetrating external object, some of them can be found freely in reticulum. Possibly, reason of this occurrence is bulge of ulcerous tissue around penetrated object. Also, contraction movement of reticulum cause entered object to reticulum, cast away to its inner enclosure. This can be seen in lesser than half of patients. While in most cases, external object continue its penetration and don't come back to reticulum and its possible create complication of TRP (6). In this study, most of founded metallic object were presence in reticulum and they were in rumen only in 116 Ross cows. This is consonant with some researches' idea that believes it is possible metallic objects go to rumen firstly then, enter reticulum (3). All penetrated metallic objects were in $\frac{1}{3}$ beneath of reticulum that it is justifiable according to weight of these objects. Also, 33.87% of studied cows had external objects and 31.8% didn't have it. Majority of nonmetallic object can be due to plentiful of these objects in environment than metallic objects. In same studied on local slaughtered cows of slaughterhouse of Ahwaz, 19.2 % of cows had external objects and 17.5% had nonmetallic object (3). In other study on slaughtered bufflehead in slaughterhouse of Ahwaz, 29 % of bufflehead had external objects and 14.5% had nonmetallic object (3). Differences of metallic and nonmetallic external object presence their frequency in environment. As you see in Table 5, needles (80.61%), 83 nails (31.68%) and 24 wires (10.76%) have penetrated into wall of reticulum that needle in 56 cases, nail in 56 cases and wire in 2 cases were penetrated into reticulum deeply. It should be known that, according to special form of wire and its more intransigent, it can penetrate into wall of reticulum easily than nail and perhaps even needle. In one experience and by feeding 20 piece wire and 10 nails to under study cows, 18 wires punched reticulum and just one nail stayed into wall of this body. This is beneficial that, wire may waste after 6 weeks that has stayed in reticulum, while nail can entire stay in this body for longer time (even one year) (10). Accordingly, although wire penetrates into wall easily and creates more serious complications, but we may encounter more nails than wire. As it can be seen in this study also, same studies before this issue. In a performed study by Sovghi in operation section of veterinary collegial of Ahwaz University, there was 49 nail apposite of 12 wires. Or in performed studied on local slaughtered cows of slaughterhouse of Ahwaz, 64 nails were seen freely, 5 nails were seen as surface penetrated and 4 nails were seen as deeply penetrated in wall of reticulum. While quantity of nails were 11, 2 and 1 respectively and needle penetrated into wall of reticulum vertically only in one case (3). According to a study on 12 bison stricken diaphragmatic hernia, these objects were found in damaged part of reticulum of 4 Ross cows: 2 needles were found in one Ross that one of them was penetrated and other one was float. 6 nails were found in one Ross that none of them penetrate. Some float metallic objects and stone were found in third bison and a piece of leather and some stones were found in fourth bison. Also, in another study on 4 Ross cows include checking after deaths, following cases were found: one nail was found in one Ross and a tailoring needle was seen in two next cows that all penetrated into reticulum and little objects were found in fourth cow (8). In the end, based on results of this study and other studies, it appears that external objects and its complications are presented as a crucial problem in cows and these stricken cows should be considered seriously, because they cause main economic damage in ranch industrial.

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