

## Rumen Impaction With Indigestible Foreign Bodies In Sheep And Goats

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### ABSTRACT

The present study was conducted for studying the clinical signs, haematological and biochemical changes in sheep and goats suffering from decrease feed intake, emaciation, distension in the abdomen and recumbency. Two blood samples were collected from each animal for studying haematological and biochemical alterations. Postmortem examination was applied and small specimens were taken from the fore stomach for histopathological examination. The results revealed a significant decrease in Hb., PCV% and RBCs while the total number of WBCs was within the normal range. Biochemical analysis revealed that there was a significant decrease in total serum proteins, albumin, globulin, Na, Cl, K and Phosphorus. There was a significant increase in serum glucose level. In postmortem examination there were indigestible foreign bodies in the form of plastics and ropes with different sizes, shape and length. Histopathological examination revealed a congestion and subcellular edema in some samples. In alive animals blood biochemical changes along with the clinical signs, external palpation of the rumen might be of some diagnostic assistance.

### INTRODUCTION

In Egypt, Sheep and goats represent one of most important animals among animal livestock. Sheep and goats are reared for their quality meat which is in rising demand by consumers in Middle East-countries and for their highly valued skin especially that of sheep (1).

It is generally accepted that sheep and goats are selective feeders and ingest significantly less foreign bodies compared to cattle, and indigestible foreign bodies (IFB) are expected to be rare in their stomachs (2). However, the ingestion of indigestible materials may occur during periods of food scarcity (3). In Egypt a large number of sheep and goats are mainly maintained on rangeland to make use of land resources and as the grazing lands become more and more polluted with plastics, ropes, hair, wool and metals, it may be predicted that foreign bodies would be a growing problem for these animals (4). This condition is economically important because of the severe loss of production. It causes high mortality rate and many cases go unrecognized.

The obstruction results from the accumulation of the indigestible materials in the rumen interfere with flow of ingesta leading to distension of the rumen and passing of scanty or no feces (5).

Ingestion of plastics does not routinely lead to clinical impaction requiring veterinary

assistance. The clinical impaction was found exclusively in goats more than 1 year of age, suggesting that time is needed for the accumulation of plastic. The prevalence was found to be significantly ( $P < 0.05$ ) lower when compared with that of cows (6).

Clinical examinations of goats with plastic impaction which were treated by rumenotomy revealed that they suffered from emaciation, loss of hair, decrease in milk production, decrease in body weight and pale mucous membranes. In some cases, diarrhea, recumbency, severe dehydration and anemia were observed. After removal of plastic masses, the health status of these goats improved and returned to normal without any complications (7).

Sheep and goats with foreign body may not show any clinical signs, only decrease body weight gain than the other animals, in some cases, diarrhea, recumbency, severe dehydration and anemia were observed. Sheep and goats with foreign body show inappetence for several days or complete anorexia with evidence or loss of body weight, an enlarged apple shaped abdomen; pear shaped on right and apple shaped or the left with or without bloat (8). The position of the impacted material in the rumen was more important than the size and weight of the indigestible foreign body in the causation of clinical impaction. Many large and heavy impacted materials in the rumen did not cause

clinical impaction except where the rumino-reticular orifices were partially or completely blocked by the presence of the materials or pressure (9).

## MATERIALS AND METHODS

### A- Animals

This study was carried on 30 sheep and 30 goats of different ages "2-3 years" in slaughter house of El- Basateen, Cairo governorate beside to 20 sporadic cases which were admitted to the clinic of the faculty of veterinary Medicine, Zagazig University. Ten sheep and ten goats clinically healthy were used as a control group from faculty of veterinary Medicine farm.

The presence of the foreign body in the living animal was examined by external palpation of the rumen in some animals but can not be detected in other animals. The presence of foreign body in the slaughtered animal was also examined in the slaughter house by opening of the rumen, As rumen can not examined by ultrasounds due to presence of gases.

### B- Samples

#### 1- Blood samples

From each animal two blood samples were taken, one with EDTA as anticoagulant for haematological examination (10) and the other for biochemical analysis. Serum glucose (11), total proteins (12), albumin (13) were measured spectrophotometrically using special test kits. Serum globulin was calculated by subtraction of the amount of serum albumin from the amount

of total serum protein. Serum sodium and potassium were determined by using flame photometer (14). Serum Chloride was determined by using test kits (15). Serum phosphorus was determined using test kits supplied by Alkan-France (16).

**2-Small pieces of the fore stomach walls** from the animal suffered from obstruction with indigestible foreign bodies were obtained for histopathological examination. Small pieces from different tissues, including the fore stomach walls, were fixed in 10% neutral buffered formalin (NBF). Section of 5  $\mu$  were cut and stained by hematoxylin and eosin (17) and examined by a light microscope,

#### Statistical analysis

The obtained data were analyzed by using a software computer program (18).

## RESULTS AND DISSCUSSION

The clinical findings were ranged from mild to severe. The animals were suffered from decreased feed intake, emaciation, loss of wool or hair and decrease in body weight in comparison with other animals reared with them with the same age and pale mucous membranes. Some cases, by palpation of the rumen hard foreign bodies were palpated. In sever cases, diarrhea, recumbency, severe dehydration and anemia were observed, these results were in agreement with that of (7, 8,9).



**Photo1.** A, Sheep shows mild clinical signs only in the form of depression and arching of back while goat shows severe depression, recumbency and in this case foreign body can be detected by palpation (B).

### I-Haematological examination

**Table 1. Mean values of Hb, PCV, RBCs and WBCs in apparently healthy and impacted sheep and goats**

Animal status	Hb g/dL	PCV%	RBCs millions/cu.mm	WBCs thous./cu.mm
Apparently healthy sheep	10.64±0.32 <sup>a</sup>	32.00±1.84 <sup>a</sup>	10.47±0.54 <sup>a</sup>	5.3±0.32 <sup>a</sup>
Impacted sheep	8.53±0.92 <sup>b</sup>	25.00±1.00 <sup>b</sup>	8.00±1.10 <sup>b</sup>	5.00±0.48 <sup>a</sup>
Apparently healthy goats	9.8±0.64 <sup>a</sup>	28.00±1.75 <sup>a</sup>	10.21±0.52 <sup>a</sup>	5.00±0.2 <sup>a</sup>
Impacted goats	8.00±0.30 <sup>b</sup>	24.00±1.00 <sup>b</sup>	8.00±0.32 <sup>b</sup>	5.00±0.1 <sup>a</sup>

Means within the same columns carrying different superscripts are significant at  $p \leq 0.05$ .

Haematological data of the impacted sheep and goats showed that there was a significant decrease in Hb, PCV% and RBCs while WBCs was within the normal range. Several studies (7,8,19,20) indicated anemia had been reported in similar

cases of indigestion which was manifested by pale mucus membrane on physical examination which may be due to impairment in absorption and utilization nutrient essential for hematopoiesis.

### II-Biochemical examination

**Table 2. Mean values of serum glucose, total proteins, albumin and globulin in apparently healthy and impacted sheep and goats**

Animal status	serum glucose (mg/dL)	total proteins (g/dL)	Albumin (g/dL)	Globulin (g/dL)
Apparently healthy sheep	89.20±2.99 <sup>b</sup>	7.45±0.21 <sup>a</sup>	3.43±0.00 <sup>a</sup>	4.02±0.01 <sup>a</sup>
Impacted sheep	105.0±3.01 <sup>a</sup>	5.36±0.18 <sup>b</sup>	2.37±0.00 <sup>b</sup>	2.99±0.00 <sup>b</sup>
Apparently healthy goats	85.6±2.00 <sup>b</sup>	7.00±0.40 <sup>a</sup>	3.00±0.2 <sup>a</sup>	4.00±0.1 <sup>a</sup>
Impacted goats	99.9±3.5 <sup>a</sup>	5.00±0.57 <sup>b</sup>	1.59±0.01 <sup>b</sup>	3.41±0.12 <sup>b</sup>

Means within the same columns carrying different superscripts are significant at  $p \leq 0.05$ .

Table 2 shows a significant increase in the serum level of glucose in impacted sheep and goats, while a significant decrease in the serum level of total proteins, albumin and globulin in impacted sheep and goats when compared with that the apparently healthy ones (9,20).

The significant increase in the serum level of glucose in impacted sheep and goats may be attributed to the systemic stress induced by

indigestible foreign bodies causing rumen impaction and due to some chemical substances released from the plastic (21).

The significant decrease in the serum level of total proteins in diseased animals may be due to poor nutrition and interferences with the onward flow of ingesta in the gastrointestinal tract and also may be due to decrease availability of dietary protein (9).

**Table 3. Mean values of serum sodium, potassium, chloride and phosphorus in apparently healthy and impacted sheep and goats**

Animal status	Serum sodium (mEq/L)	Potassium (mEq/L)	Chloride (mEq/L)	Phosphorus (mg/dL)
Apparently healthy sheep	147± 2.35 <sup>a</sup>	5.00±0.32 <sup>a</sup>	99±1.76 <sup>a</sup>	6±0.5 <sup>a</sup>
Impacted sheep	135±2.00 <sup>b</sup>	3.8±0.00 <sup>b</sup>	91.02±0.8 <sup>b</sup>	4.3±0.30 <sup>b</sup>
Apparently healthy goats	145± 1.5 <sup>a</sup>	4.5± 0.40 <sup>a</sup>	96±1.45 <sup>a</sup>	5.0±0.4 <sup>a</sup>
Impacted goats	132±2.05 <sup>b</sup>	3.4±0.00 <sup>b</sup>	89±1.02 <sup>b</sup>	4.00±0.1 <sup>b</sup>

Means within the same columns carrying different superscripts are significant at  $p \leq 0.05$ . T

Table 3 shows that there was a significant decrease in serum level of sodium, potassium, chloride and phosphorus in diseased animals when compared with that of apparently healthy animals.

The biochemical changes in the form of hyponatremia, hypochloraemia, hypokalemia and decrease phosphorus level may be due to decrease availability of salts "addition of mineral mixture to the ration of the animals". Abnormal appetite or pica has been associated with phosphorus deficiency (22). However pica may sometimes associated with phosphorus deficiency but rather related to poor nutrition, anemia, iron and cobalt deficiencies and other causes (22).

### III-Postmortem examination

Postmortem examination of the examined animals revealed that, some animals showed only presence of indigestible foreign bodies without any abnormalities in the fore stomach wall, while others showed ruminitis & haemorrhage, which confirmed by microscopic examination. Our results were in agreement with that of (6, 8, 9). These indigestible foreign bodies were in the form of plastics, ropes and cellophane papers, but the high incidence was in form of plastics and ropes. The size of indigestible foreign bodies varied from few grams to about 1 kg.



**Photo 2. This photo showed impacted fore stomach with congestion blood vessels and different shapes of indigestible foreign bodies.**

### Histopathological examination

Microscopical examination of some specimens taken from the rumen of diseased sheep was normal, while others revealed congestion, subcellular edema and hyperplastic changes (6, 8), changes may be due to the pressure on the wall of fore stomach by the foreign bodies and also may be due to the

chronic irritation of the wall by foreign body or due to some chemical substances released from the plastic, leaving the wall exposed to secondary infection which results in both inflammatory and hyperplastic changes. These changes are considered a fertile media in which cancerous proliferation may eventually arise (23).

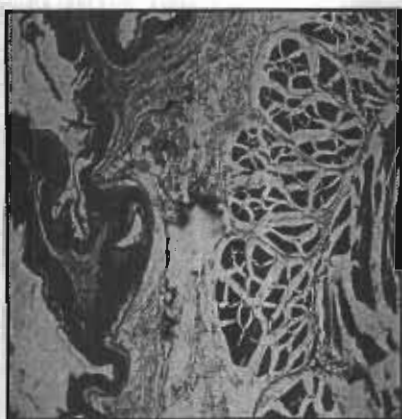


Figure 1. This figure showed rumen with intramuscular edema and submucosal edema by H&E stain X300.

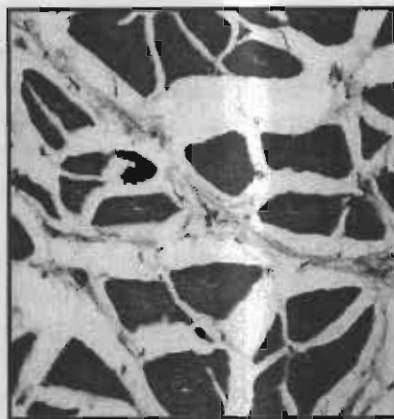


Figure 2. This figure showed intramuscular edema stained by H&E X1200, edema represented by esinophilic fibrin threads.



Figure 3. Edema with focal aggrigation.



Figure 4. High power of figure "3" showing round cell "Plasma cell" which indicate chronic inflammation.



Figure 5. Figure shows desquamation of linning epithelium.

### CONCLUSION

From this study it is concluded that ruminal impaction with indigestible foreign bodies especially "plastics and ropes" may occur without appearance of obvious clinical signs on the animals. But emaciation, decrease feed intake as well as alterations in blood biochemistry, probably help in diagnosis with the clinical assessment, also ruminal impaction with indigestible foreign bodies plays an important roles in the pathogenesis of

rumenitis in sheep and goats. The most common foreign body in such cases were plastics and ropes and pica plays an important role in the occurrence of the disease, so the cleaning- up of the environment and addition of salts for treatment of pica may reduce foreign bodies ingestion in sheep and goats. In addition we should give balanced ration containing all nutritional requirements beside the vitamins and the minerals will substantially reduce foreign body-pica syndrome in sheep and goats.

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### الملخص العربي

تخمة الكرش بالأجسام الغريبة غير المهضومة في الأغنام والماعز

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أجريت هذه الدراسة لمعرفة مدى تأثير وجود الأجسام الغريبة غير المهضومة في كرش الأغنام والماعز علي الحالة الصحية للحيوان وعلي صورة الدم وكذلك علي جدار الكرش ، حيث تم متابعة عدد ٢٠ حالة " ١٠ من الأغنام و ١٠ من الماعز" والتي تم استقبالها في مستشفى كلية الطب البيطري- جامعة الزقازيق وأخذ ١٠ حيوانات كمجموعة ضابطة كما تم متابعة عدد 6٠ حالة من الأغنام والماعز" ٣٠ من الأغنام و ٣٠ من الماعز " في مجزر البساتين بمحافظة القاهرة وقد تم تسجيل الأعراض الاكلينيكية التي ظهرت علي هذه الحيوانات والتي تمثلت في الهزال العام والنفخ البسيط في البطن وكانت هناك بعض الحالات تعاني من الركوض. وتم أخذ ٢ عينة دم من كل حالة قبل الذبح للفحص الهيماتولوجي والبيوكيميائي. بعد الذبح تم فحص الكرش وباقي المعدة وتم أخذ عينات منها للفحص الهستوباثولوجي.

وقد تبين من فحص الدم وجود نقص معنوي في مستوي كل من الهيموجلوبين و حجم الخلايا المضغوطة وكرات الدم الحمراء بالمقارنة مع الفحص الهيماتولوجي للمجموعة الضابطة. أيضاً تبين من الفحص البيوكيميائي وجود نقص معنوي في مستوي البروتين الكلي والألبومين و الجلوبيولين وبعض العناصر مثل الصوديوم والكلوريد و البوتاسيوم والفوسفور بينما كان هناك زيادة معنوية في مستوي الجلوكوز.

وبفحص محتويات الكرش في الحيوانات المذبوحة تبين وجود أجسام غريبة غير مهضومة في الكرش مثل البلاستيك والأحبال الملفوفة بعضها حول بعض وسط العصارة الموجودة في الكرش. وقد تبين في الفحص الهستوباثولوجي عدم وجود تغييرات هستوباثولوجية في بعض العينات و في البعض الآخر كان هناك احتقان و اديميا في جدار الكرش.

وقد خلصت هذه الدراسة الي أن ظهور الأعراض السابقة مع نتائج تحليل الدم والهستوباثولوجي وأيضاً محاولة جس الكرش من الخارج وتحسس وجود أجسام غريبة يمكن أن ندلنا علي وجود هذه الأجسام الغريبة في الكرش وخاصة أن هذه الأجسام لايمكن التعرف عليها بواسطة الموجات فوق الصوتية وأشعة "اكس" ، ولذا ننصح بتنظيف الأماكن التي تربي فيها هذه الحيوانات من الأجسام مع تقديم عليقة متوازنة تحتوي علي كل العناصر الغذائية والفيتامينات والأملاح المعدنية حسب احتياجات الحيوان.