Gross Pulmonary Lesions of Bovine Lung Slaughtered at Jimma Municipality Abattoir, Ethiopia

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Abstract

This study was carried out from November 2007 to May 2008 to determine the prevalence and distribution of pulmonary lesions in different lobes in Jimma municipality abattoir. Cross sectional study by gross examination of cattle lung was done in the abattoir to determine pulmonary lesions. From 384 lungs examined, 91.7% was found to have one or more lesions. Hydatidosis (108, 28.1%), emphysema (115, 29.9%), atelectasis (72, 18.8%), congestion (191, 49.7%), abscess (21, 5.5%), and lung parasite (1, 0.3%) were found during the study period. Body condition association with the lesions were studied and pulmonary abscess and pulmonary emphysema has significant effect (p<0.05) on poor body conditioned animals. Animals with fat body condition were significantly affected (p<0.05) by pulmonary congestion and atelectasis. Lung parasite and hydatidosis found having no significant association with the animal body condition. In conclusion lung is a highly condemned organ due to different pulmonary lesions occurring which in turn results a significant economic loss.

Keywords: Abattoir; Cattle; Gross examination; Prevalence; Pulmonary lesion

Introduction

The world human population is growing at faster rate than food production and this increase is mainly in developing counties, which are unable to assure adequate food for their people. Developing countries have nearly 2/3 of the world’s livestock population, but produce less than a third of the world’s meat and fifth of its milk [1]. Among the top challenges, animal diseases are the primary constraints in increasing the productivity of food animals in sub-Saharan Africa [2].

Similarly, like many other tropical countries in Africa, it’s well known that parasitic diseases are the major factors responsible for low productivity in livestock in Ethiopia. Although various investigations have been conducted through abattoir survey to determine the prevalence and economic loss resulting from organ condemnation in Ethiopia, most of the surveys were focusing only on parasitic cases such as hydatidosis and fasciolosis [3]. Lung is a vital organ of the body and susceptible for several pathological changes indicative for disease conditions. Lung gets condemned for consumption if there is any pathological evidence of significant infectious diseases or disease conditions during carcass inspection.

Because of the public health problems and economic loss due to carcass condemnation pulmonary diseases like tuberculosis, hydatid cyst, and lung worms are among the most important listed [4,5]. Parasitic diseases like hydatidosis, verminous pneumonia; bacterial diseases such as tuberculosis, abscess, viral diseases such as rhinitis, influenza and fungal diseases like mycoplasmosis, aspergillosis are the most common causes of condemnation of lungs. Besides, several other pathological conditions like fibrosis, abscess, atelectasis, cysts, hemorrhages, congestion, edema, and pneumonia are common in lungs [6]. There are a few reports on the prevalence respiratory lesions in Ethiopia. Thus the current study was designed to provide on the prevalence of pulmonary lesions in cattle, and determine the risk factors of associated with the prevalence of pulmonary lesions in Jimma municipality abattoir.

Materials and Methods

Study area

The study was conducted in Jimma municipality abattoir, South Western part of Ethiopia. Jimma town is located in Oromia regional Administration, 346 km South West of Addis Ababa at altitude of about 7°13’-8°56’N and longitude of about 35°51’-37°37’E and an elevation ranging from 880 m to 3360 above the mean sea level [7].

Study sample

The study was conducted on lung from apparently healthy cattle for slaughter in Jimma municipality abattoir.

Study design

A cross sectional survey was conducted by using systematic random sampling to determine the prevalence and the distribution of lesion in different lobes collected from November 2007 to May 2008. Using asystematic random sampling of animals, every 4th animal was selected and their body condition was recorded for further postmortem examination of their lungs.

Sample size determination

The number of study samples (lung) was determined based on the expected prevalence of lung lesions (50%) Salmonella and the desired absolute precision stated on Thrustfield [8].

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prevalence of 1.6% in fat, 6.3% in medium and 8.2% in lean animals were found. The prevalence of pulmonary abscess has significant (p<0.05) association with body condition that is poor body conditioned animals are highly affected (Table 2).

**Pulmonary emphysema**

The total prevalence of pulmonary emphysema among the samples examined was 29.9%. Depending on their body weight category a prevalence of 18.9% in fat, 32.4% in medium and 33.6% in lean animals were found. Pulmonary emphysema has strong association with body condition in which lean animals are highly affected (Table 3).

**Pulmonary congestion**

The total prevalence of pulmonary congestion among the samples examined was 49.7%. Depending on their body weight category a prevalence of 65.4% in fat, 53.2% in medium and 33.6% in lean animals were found. Animals with fat body condition were significantly affected (p<0.05) by pulmonary congestion (Table 4).

**Parasitic pneumonia**

The total prevalence of lung parasite among the samples examined was 0.3%. Depending on their body weight category a prevalence of 0% in fat, 0% in medium and 0.68% in lean animals were found. Body condition has no significant association (p>0.05) with lung parasite (Table 5).

**Discussion**

In this study, the total presence of lung lesions was found a little higher than Abayneh [9] who found 83.87% in Asella abattoir, Ethiopia. The variation of prevalence may occur due to difference in management practices and difference in environmental conditions. Based on gross examination of lesions among six lesions studied congestion found to be higher than others followed by emphysema, hydatidosis, abscess and lung parasite. The high rate of congestion could be due to inefficient bleeding during slaughter.

| Body condition | No of cattle examined | No. of positive | Prevalence (%) | p-value |
|----------------|-----------------------|-----------------|----------------|---------|
| Fat            | 127                   | 27              | 21.3           | 0.094   |
| Medium         | 111                   | 33              | 29.7           |         |
| Lean           | 146                   | 48              | 32.9           |         |
| Total          | 384                   | 108             | 28.1           |         |

| Body condition | No of cattle examined | No. of positive | Prevalence (%) | p-value |
|----------------|-----------------------|-----------------|----------------|---------|
| Fat            | 127                   | 2               | 1.6            | 0.049   |
| Medium         | 111                   | 7               | 6.3            |         |
| Lean           | 146                   | 12              | 8.2            |         |
| Total          | 384                   | 21              | 5.5            |         |

**Table 1:** The prevalence of hydatidosis on bovine lung with different body conditions.

| Body condition | No of cattle examined | No. of positive | Prevalence (%) | p-value |
|----------------|-----------------------|-----------------|----------------|---------|
| Fat            | 127                   | 24              | 18.9           | 0.003   |
| Medium         | 111                   | 36              | 32.4           |         |
| Lean           | 146                   | 55              | 37.7           |         |
| Total          | 384                   | 115             | 29.9           |         |

**Table 2:** The prevalence of pulmonary abscess on bovine lung with different body conditions.
The study reveals a high rate of congestion in lung of cattle. Pulmonary congestion was higher in animals with fat body condition that may be due to struggling during slaughter and inefficient bleeding. Different result of congestion found in different countries like in Bangladesh, 61.53% result reported by Rahman et al. [10], the difference might be due to inefficient bleeding during slaughtering process. This study found a high rate of emphysema found but it is lower than 83% report in Bangladesh by Rahman et al. [10] which may be due to seasonal difference during studying. The high rate of emphysema may be due to stress factors including transportation, exposure to dust, starvation and poor management system. Animals with poor body condition were highly affected that may be due to the availability of concurrent infection. The prevalence of hydatidosis in this study is in agreement with Rahman et al. [10] in Bangladesh who found 25% prevalence and higher than 13.5% report in Turkey by Umer [11]. High rates of hydatidosis were reported in other areas of Ethiopia like 61% in Assela [12] and 46.5% in Debret Zeit [3], Kassahun [13] investigated the occurrence of hydatidosis in Mekelle abattoir and reported a higher prevalence of 32.1%, out of which 49.45% were found in lungs. Samuel also reported a higher (34.6%) of pulmonary Hydatidosis, Direawa abattoir, Eastern Ethiopia. Factors such as difference in culture, social activity, animal husbandry systems, lack of proper removal of infectious carcass, and attitude to dogs in different regions might have contributed to the variation in prevalence in different areas of a country [14] and strain differences of *E. granulosus* that exists in different geographical location [15]. This study also showed a lower rate of pulmonary abscess, which is similar with Rahman et al. [10] who reported 5.6% prevalence in Bangladesh. Animals with poor body condition were found to be significantly affected by pulmonary abscess that may be due to poor immunity and the presence of concurrent infection. In this study lower rate of parasitic pneumonia were found which is in line with 0.96% report in Direawa by Tajik et al. [16] reported 44% prevalence in Iran which is very high than the present study. Lower rate could be due to the climatic condition especially for Dictyocaulus as Eslami [17-21] stated that Dictyocaulus in cattle is widely present in temperate and subtropical areas. It is very common in regions with a moist temperate with mild climate and high rainfall.

### Conclusions and Recommendations

As conclusion a high rate of organ condemnation occurs due to different reasons. A high rate pulmonary lesion found in this study indicates that lung is one of the organs which could be affected with different lesions resulting high condemnation rate. A high rate of loss of money occurs due to organ condemnation. In addition, this investigation indicates there is a public health concern especially associated with abscess and hydatidosis. Therefore, strategic control of disease should be implemented to avoid further economic loss and public health hazards.

**Conflict of Interest**

The authors declare that they do not have a conflict of interest.

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| Body condition | No of cattle examined | No. of positive | Prevalence (%) | p-value |
|----------------|----------------------|----------------|----------------|---------|
| Fat            | 127                  | 83             | 65.4           | 0.000   |
| Medium         | 111                  | 59             | 53.2           |         |
| Lean           | 146                  | 49             | 33.6           |         |
| Total          | 384                  | 191            | 49.7           |         |

Table 5: The prevalence of parasitic pneumonia on bovine lung with different body conditions.

| Body condition | No of cattle examined | No. of positive | Prevalence (%) | p-value |
|----------------|----------------------|----------------|----------------|---------|
| Fat            | 127                  | 0              | 0              | 0.442   |
| Medium         | 111                  | 0              | 0              |         |
| Lean           | 146                  | 1              | 0.68           |         |
| Total          | 384                  | 1              | 0.3            |         |

Table 4: The prevalence of pulmonary congestion on bovine lung with different body conditions.