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Gross and histopathological examination of pulmonary lesion in cattle slaughtered at Gondar ELFORA abattoir, north Ethiopia

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Abstract

Across- sectional study was conducted on gross and histopathological examination of pulmonary lesions on cattle slaughtered at Gondar ELFORA Abattoir from November, 2016 to March 2017 with the objectives of pathological and histopathological examination of lung lesions, prevalence determination of various pulmonary lesions and the risk factors if any. Gross lesions were appreciated after hematoxylin and eosin stain grossly, the most important various were emphysema, pale and dark red to dark gray color of the lung, hepatization, Pleurisy, congested lung and abscess at different parts of the lung were appreciated. Histologically, ruptured alveoli, eosinophillic inflammatory cells were seen. Breed, age and body condition of the animal were studied. The gross lesions identified were pneumonia 5.5%, hydatidosis 5.01 %, emphysema 4.01%, calcified lung 1.50%, abscess 1.50%, congested lung 2.5%, pleurisy 1.25 % and hemorrhagic lung 1.5%. The overall prevalence found to be 91(22.80%). the prevalence of gross lesions in adult and old animals was 17.78% and 26.31%. A prevalence of 25.18%, 22.36% and 20.38% were seen in poor, moderate and good body conditions, respectively. The prevalence of gross lesions in local breed 23.35% and 20% in cross one. Microscopically, from 91(22.80) gross lesions 57(14.28%) lesions were found. The rates of microscopic lesions, in adult and old age group were 11.26% and 15.74% found respectively. In poor, moderate and good body conditions scores were 17.03%, 15.5% and 8.74%, respectively. Microscopic lesion rate was also varied based on their bred, 13.77% local bred and 16.92% in cross one. Therefore, in the current study there is significant statistical variation (P<0.00) among the associated risk factors involved for the occurrence of significant damage on the lung and produce characteristic gross and microscopic lesions.

Keywords: Cattle, Gross lesions, Histopathology, prevalence, pulmonary lesion.

Introduction

Ruminants represent an important segment of the Ethiopian livestock system. The national livestock population of Ethiopia is the largest in Africa and is estimated to be 59.5 million cattle, 30.70 million sheep, 30.20 million goats, 2.16 million horses, 8.44 million donkeys, 410 thousand mules, 1.21 million camels, 56.53 million poultry (CSA, 2017).

Diseases that occur in livestock have two major impacts. These two major impacts have highly pronounced effect on large scale abattoirs where there is large number of animals' slaughtered and large number of workers present. In addition to the risks on them, abattoirs have high responsibility to provide risk free and wholesome products to the society (Marta, 2010). Meat inspection is commonly perceived as the sanitary control of slaughter animals and meat. The aim of meat inspection is to provide safe and wholesome meat for human consumption. The responsibility for achieving this objectives lies primarily with the relevant public health authorities, who are represented by veterinarians and meat inspectors at the abattoir stage (FAO, 2007).

A thorough meat inspection procedure requires two steps; ante mortem and postmortem inspections. The importance of ante mortem inspection in the abattoir has long been recognized in an attempt to avoid the introduction of clinically diseased animals into the slaughter hall and should be done within 24 hours of slaughter and repeated if slaughter has been delayed over a day (Graceyet *al.*, 1999; Teka, 1997.

The purposes of meat inspection, comprising of ante mortem and postmortem examination, are to remove gross abnormalities from meat and its products, prevention and distribution of contaminated meat that could result to disease risk in man and animals and assisting in detecting and eradication of certain diseases of livestock (Van longtestijin, 1993). It is necessary to be aware of the extent to which the public is exposed to certain zoonotic diseases detected in abattoirs and the financial losses through condemnation of affected organs and carcass (Nfi and Alonge, 1987). Postmortem inspection is the center around which meat hygiene revolves since it provides information indispensable for the scientific evolution of clinical signs and pathological processes that affect the wholesomeness of meat (Libby, 1975; Gracey *et al*., 1999).

Disease causes extensive financial wastes as a result of direct and indirect economic losses, is the major concern to livestock industry. Study conducted in different abattoirs of Ethiopia revealed that parasitic infection of livers, lungs (pneumonia), pericarditis and pyelonephritis are found to be the major causes of organ condemnation, with an approximate annual loss of 2.7million ETB at Debrezeit HELIMEX abattoir Jibat, 2006; 106,788.18 ETB in Gondar municipal abattoir Yimam, 2003; 180,942.4 ETB in Bahir Dar Municipality Abattoir (Yohannes, 1994).

Cattle are affected by lung diseases that can be grossly or histopathogicalglly examined. Lung diseases are caused by different factors depending on the different causative agents. From these, metabolic disturbances are the major causes which facilitate these lung diseases, such as, Pulmonary calcification (Andrew *et al*., 2003), abscess (Radositis *et al*., 2007), Pulmonary Emphysema (Jubb *et al.*, 2007), Pulmonary Congestion (Radostitis *et al*., 2007), Pneumonia (Bradford, 1996), hydatidosis (Kassai, 1999) are the main respiratory problems encountered in cattle associated to the lung.

Since living cells and tissues are difficult to examine microscopically because they are relatively transparent and thick but this problem is reduced when thin sections of tissues are obtained, stained and examined (Dellman, 1993), histopathological diagnostic technique is necessary to confirm pathological lesions at microscopic level.

Therefore, the objectives of this study were:

-To estimate the prevalence of pulmonary lesions on cattle slaughtered at Gondar ELFORA.
-To examine the major pulmonary lesions grossly and histopathologically on cattle slaughtered at Gondar ELFORA.
-To assess the important risk factors associated with pulmonary lesion in cattle.

Materials and Methods

Study area

The study was conducted at Gondar ELFORA abattoir, located in northwest Ethiopia. animals slaughtered in Gondar ELFORA abattoir were brought from different areas such as; Fogera, wogera, chiliga, Dabat, Belesa, Gaint, as well as from Wollo. Gondar town is the capital of North Gondar, zone of Amhara region which is located in North Western part of Ethiopia at about 748km away from Addis Ababa. The city has a latitude and longitude of \12°36′N37°28′E/ 12.6°N 37.467°E / 12.6; 37.467. And the altitude is 2133 m.a.s.l. The area is located under Woynadega, agro-climatic zone and receives a bimodal rainfall; the average annual rainfall is about 1172 mm with 19.7oc annual average temperature. The human population of the town is 360,600 and the cattle population is 2,407,544 (CSA, 2017).

Study animal and population

The cattle destined for slaughter during the study period were all male cattle. The average numbers of animals slaughtered at this abattoir were a maximum of 70 and a minimum of 20 on average 30 cattle were slaughtered per day. According to the current document of north Gondar zone agriculture and rural development office, the livestock population of the area is 2,407,544 cattle. The human population of North Gondar is 2,896,873 of which 1,569,205 are males and 1,327,668 are females and the cattle population is 2,407,544 (CSA, 2017). A total of 399 cattle destined for slaughter were inspected during

ante mortem and postmortem inspections their specific identification numbers, age, breed, body condition and any abnormalities were recorded.

Sampling method and sampling size

The study animal was selected by simple random sampling method. Determination of the sample size for the prevalence of lung lesion that needs to be examined grossly and histopatologically in Gondar ELFORA, was taken by assuming an expected prevalence of 50% to get the maximum number required (Thrusfield, 2005) with 95% confidence interval and at 5% absolute precision. Therefore, at 50% expected average prevalence a sample size of 399 was the sample. In this study the cattle were selected for every 3rd entry and examined by ante mortem and postmortem examination for three days per week of visiting the abattoir (Friday, Saturday and Wednesday).

Materials

The equipment and tools that were intended to be used for the study are; sampling bottle, cotton, surgical glove, scissor, artery forceps, blade no 24., automatic tissue processor, scalpel blade, wax dispenser, embedding ring, embedding mold, microtome, mounting bath, slide drying bench, slides, cover slip, mountant dipex, tissue cassette.

Chemicals and reagents: xylene, alcohol (100-70%), paraffin, hematoxylin and eosin dyes and sodium mono phosphate and sodium di phosphate, formaldehyde (10%).

Paraffin technique is used for histopathogical examination.

Study design

A cross sectional study was carried out from November 2016 to March 2017 by collecting data on events associated with lung lesions examined grossly and histopathologically on cattle slaughtered at Gondar ELFORA abattoir.

Study methodology

Ante mortem examination

During ante mortem examination, detail records about breed, age, body condition of the animal and any abnormality to the animal by physical examination especially that was associated with the lungs are recorded. The age estimation was based on dentations and owner's information, whereas body condition scoring was done according to the personnel's who had working in the abattoir.

Post mortem examination

During postmortem examination, lungs were systematically inspected for the presence of any gross lesions by applying routine meat inspection procedures which consisted of primary examination by visualization of the organ followed by a secondary examination, whereas secondary examination involved further palpation, incisions were applied into this organs to all individual animal turn by turn according to their order after recording the data that were available at ante mortem examination.

Investigation procedures

After the animal was supposed to be examined for ante mortem and postmortem examination, the presence of any typical gross lesions of the lung was identified by visual observation, palpation and incision, and then the tissue was trimmed by using tissue forceps for easy handling of the tissue to trim using surgical blade 24. About 1cm^3 of tissue was cut from the lung, half from healthy and half from abnormal section of each affected slaughtered, was trimmed, the tissue trimmed was immersed into the sampling bottle containing 10% formaldehyde. The lung sample collected during postmortem examination was transported to university of Gondar, faculty of veterinary medicine, veterinary pathology laboratory for histopathological examination by using plastic bags. Trimmed into the size of 4-6mm thick, by using scissor, and inserted into the tissue cassette, washed with water bath, after adjusting the automatic tissue processor machine, inserted into the dehydrating and clearing agents and then embedded in paraffin. Sectioned into 4- 6µm by using micrometer, stretched on to luck water at 45^{o}c in water bath. Picked up with a microscope slide and dried on slide drier. Stained with hematoxylin and eosin staining technique to appreciate lesions appeared on the cytoplasm or nucleus of the tissue. Mounted on the slide with the mountantdipex, then examination processed on light microscope in 4xs, 10xs, 40x and 100 x magnifications and identification of the lesions were done.

Data analysis

Data generated from ante mortem examination, postmortem examination and microscopic examination were entered in to Microsoft excel worksheet and was analyzed using Statistical Package for Social Sciences (SPSS version 17).

Results

From the total 399 bovine lungs examined with gross lessons 91(22.80%) were found to have different lung lesions. The identified pulmonary gross lesions were found to fall in to 8 different pulmonary gross lesions with prevalence rate of 5.5 % pneumonia, 5% hydatid lungs, 4.01 % emphysema, 2.5% congestion, 1.5% calcification, 1.5% abscess, 1.5% hemorrhage and 1.25% pleurisy.

From the total of 91 lungs identified with gross lesions, 57(62.63%) showed microscopic findings by histopathological examination with their corresponding lesions examined grossly with the percentage of 3(3.3%) alveolar emphysema, 5(5.5%) interstitial emphysema, 4(4.4%) abscess, 5(5.5%) hemorrhage, 7(7.7%) congestion, 10(10.10%) hydatidosis, 7(7.7%) bronchopneumonia, 9(9.9%) interstitial pneumonia, 3(3.3%) pleurisy and 4(4.4%) calcified lungs.

Generally, the highest occurrence rate of lung lesions examined grossly was pneumonia while the lowest rate was observed in pleurisy. On the other hand, the highest microscopic results were recorded in hydatidosis and the lowest number recorded was being in alveolar emphysema and pleurisy.

Prevalence of Gross Lesions

Higher prevalence of lung lesion was recorded in old animals 26.31% than adults ones 15.78%. The difference in the prevalence rate between the two age groups was statistically significant (P<0.05), the prevalence of different lung lesions falling into eight types was studied in relation to the age of animals. In adult animals the prevalence rate of 4.51% pneumonia 4.51% emphysema, 1.53%abscers,1.12% calcification, 0.75% hydatidosis, 1.53% congestion and 0.75%hemorrhage was recorded while the rate of occurrence in old age animals was 6.01% pneumonia, 3.70% emphysema, 1.50% abscess, 2..25% calcification, 7.13% hydatidosis, 3.02% congestion,1.82% pleurisy and 1.82% hemorrhage as indicated in table 1. The variation in the prevalence of the different types of gross lesions of the lungs in animals with different age group was statistically significant (p<0.05).

Table 1. The prevalence rate of different lung lesions on the basis of age

Age	N	No of animals positive for each gross lesions and their %							
		Pneumonia	**Emphysema**	**Abscess**	**Calcification**	**Hydatidosis**	**Congestion**	**Pleurisy**	**hemorrhage**
Adult	133	6(4.51)	6(4.51)	2(1.53)	3(1.12)	1(0.75)	2(1.53)	-	1(0.75)
Old	266	16(6.01)	10(3.70)	4(1.50)	3(2.25)	19(7.13)	8(3.02)	5(1.82)	5(1.82)
Total	**399**	**22(5.51)**	**16(4.01)**	**6(1.51)**	**6(1.51)**	**20(5.01)**	**10(2.51)**	**5(125)**	**6(1.51)**

$X^2 = 4.34$, ($p<0.05$)

In addition, the occurrence of bovine lung gross lesions among the animals of different body condition was studied and the highest rate was recorded in animals with poor body condition (25.18%) followed by those with moderate (35.44%) and good (20.38%). The difference in the prevalence rates with different body condition was statistically significant (P<0.05). The occurrence of different gross lesions of the lung in animals with different body condition score was studied and provided in table 2. Gross lesion of the lung among different body condition score of the animal was statistically significant (p<0.05).

Table 2. Prevalence of each gross lesion of the lung on body condition base

BCS	N	No of animals positive for each gross lesions and their percentage (%)							
		Pneumonia	**Emphysema**	**Abscess**	**Calcification**	**Hydatidosis**	**Congestion**	**Pleurisy**	**Hemorrhage**
Poor	135	6(4.44)	7(5.18)	3(2.22)	2(1.48)	7(5.18)	4(2.96)	3(2.22)	2(1.48)
Moderate	161	13(8.07)	5(3.12)	2(1.24)	-	9(5.59)	4(2.48)	-	3(1.86)
Good	103	3(2.9)	4(3.88)	1(0..97)	4(3.88)	4(3.88)	2(1.94)	2(1.94)	1(0.97)
Total	**399**	**22(5.51)**	**16(4.01)**	**6(1.50)**	**6(150)**	**20(5.01)**	**10(2.50)**	**5(1.25)**	**6(1.50)**

X^2=4.18, ($p<0.05$)

The occurrence rate of bovine lung gross lesion among animals of different breed was studied and the highest rate was recorded in animals with local breeds (23.35%) than cross (20%). The difference in prevalence rate the two breed was statistically significant ($p<0.05$). And the prevalence of the different gross lesions was studied in relation to the breed of animals indicated in table 3. The variation in the prevalence of the different gross lesions of bovine lung in animals with different breed was statistically significant ($p<0.05$).

Table 3. Occurrence of gross lesions of the lung on breed basis

Breed	Examined animals	No of animals positive for each gross lesions and their percentage (%)							
		Pneumonia	**Emphysema**	**Abscess**	**Calcification**	**Hydatidosis**	**Congestion**	**Pleurisy**	**hemorrhage**
Local	334	17(5.08)	14(4.19)	5(1.49)	6(1.79)	20(5.98)	8(2.39)	5(1.49)	3(0.89)
Cross	65	5(7.09)	2(3.07)	1(1.33)	0	0	2(3.07)	0	3(4.6)
Total	**399**	**22(5.51)**	**16(4.01)**	**6(1.50)**	**6(1.50)**	**20(5.01)**	**10(2.50)**	**5(1.25)**	**6(1.5)**

X^2= 3.81,($p<0.05$)

Table 4. Prevalence of bovine gross pulmonary lesions in relation to age, BCs and breed basis

Risk factor		N	No of positive	relative prevalence	X^2 (P-value)
Age	adult	133	21	15.78	3.43(0.013)
	Old	266	70	26.7	
BCS	poor	135	34	25.18	4.27(0.00)
	Moderate	161	36	22.36	
	Good	103	21	20.38	
Bred	local	334	78	23.35	5.23(0.043)
	Cross	65	13	20.00	
Total		**399**	**91**	**26.54**	

Prevalence of microscopic lesion

The occurrence rate of lung lesions examined microscopically was recorded in old animal (15.75%) and in adult animals (11.26%) and also the difference in the prevalence rate between the two age groups was statistically significant ($p<0.05$). the prevalence rate of pulmonary lesions examined histopathologically with different pulmonary lesions was studied in table 4.

Table 5. Microscopic findings of pulmonary lesions on age basis

Age	N	No of positive animal's pulmonary lesions with microscopic findings and their percentage (%)									
		Abscess	Hemorrhage	Congestion	Hydatidosis	Emphysema		Pneumonia		Pleurisy	Calcification
						Al. Em	In .em	B. Pn	I. pn		
Old	266	2((0.75)	4(1.50)	6(2.25)	6(2.25)	1(0.37)	3(1.12)	5(1.87)	6(2.25)	3(1.12)	3(1.12)
Adult	133	2(1.50)	1(075)	1(0.75)	1(0.75)	2(1.50)	2(1.50)	2(1.50)	3(2.25)	0	1(0.75)
Total	**399**	**4(1.00)**	**5(1.25)**	**7(1.25)**	**10(2.50)**	**3(0.75)**	**5(1.25)**	**7(1.75)**	**9(2.25)**	**3(0.75)**	**4(1.0)**

X^2 = 3.43, ($p<0.05$)

Al. em - alveolar emphysema, I. em- interstitial emphysema, B. pn- bronchopneumonia, I.pn -interstitial pneumonia

The occurrence rate of lung lesions examined microscopically was recorded in old animal (15.75%) and in adult animals (11.26%) and also the difference in the prevalence rate between the two age groups was statistically significant ($p<0.05$) as indicated in table 8. The prevalence rate of pulmonary lesions examined histopathologically with different pulmonary lesions was studied and showed in table 5.

Table 6.Microscopic results of pulmonary lesions in relation to body condition score**.**

Age	N	No of positive animals for pulmonary lesions with microscopic findings and their percentage (%)									
		Abscess	Hemorrhage	Congestion	Hydatidosis	Emphysema		Pneumonia		pleurisy	Calcified lung
						Al. em	I. em	B.pn	I.pn		
Poor	135	3(2.22)	2(1.48)	3(2.22)	3(2.22)	1(0.74)	2(1.48)	1(0.74)	4(2.96)	2(1.48)	2(14 8)
Moderate	161	1(0.62)	2(1.24)	3(1.86)	6(3.74)	2(1.24)	1(0.62)	5(3.10)	5(3.10)	0	0
Good	103	0	1(1.97)	1(0.97)	1(0.97)	0	2(1.94)	1(0.97)	0	1(0.97)	2(1.94)
Total	**399**	**4(1)**	**5(1.25)**	**7(1.75)**	**10(2.50)**	**3**	**5**	**7**	**9**	**3**	**4**

X^2=4.27, ($p<0.05$)

Al. em - alveolar emphysema, I. em- interstitial emphysema, B. pn- bronchopneumonia, I.pn - interstitial pneumonia

In this study the highest occurrence rate of pulmonary lesions on microscopic examination was recorded. In animals with poor body condition score (17.03%) followed by moderate body conditions scores (15.52%) and lowest in animals with good (8.74%). The difference in the prevalence rate among animals of three body condition scores was statistically significant ($P<0.05$) as provided in table 8.

In addition, the prevalence of different pulmonary lesions examined microscopically was studied on the basis of three body condition scores of animals. In animals with poor body condition the prevalence rate of 2.22% abscess, 1.48% hemorrhage, 2.22% congestion, and 2.22% hydatidosis 0.74% bronchopneumonia, 2.96% interstitial pneumonia, 1.48% pleurisy and 1.48%calsfied was recorded. The rate of occurrence in moderate animals was 0.62% abscess, 1.24% hemorrhage, 1.86% congestion, 3.72% hydatidosis, 1.24% alveolar emphysema, 0.62% interstitial emphysema, 3.10% bronchopneumonia, 3.10% interstitial pneumonia. While the prevalence rate in good body condition score animals 0.97%halmorrage, 0.97% congestion, 0.97%hydatidosis, 1.94% interstitial emphysema, 0.97% bronchopneumonia, 0.97% pleurisy and 1.94% calcified lung as provided in table 6.

Table 7. Microscopic findings of pulmonary lesion on breed basis

Breed	N	No of positive animals with pulmonary lesions in microscopic findings for each lesions and their percentage (%)									
		Abscess	Hemorrhage	Congestion	Hydatidosis	Emphysema		Pneumonia		Pleurisy	Calcified lung
						Al Em	I-Em	B-pn	I-pn		
Local	334	3(0.9)	2(0.6)	5(1.49)	10(2.99)	2(0.6)	5(1.49)	5(1.49)	7(2.09)	3(0.9)	4(1.19)
Cross	65	1(1.5)	3(4.61)	2(3.07)	-	1(1.53)	-	2(3.07)	2(3.07)	-	-
Total	**399**	**4(1)**	**5(1.25)**	**7(1.75)**	**10(2.5)**	**3(0.80)**	**5(1.2)**	**7(1.75)**	**9(2.2)**	**3(0.8)**	**4(1.00)**

$X^2 = 5.23$, ($p<0.05$)

Higher rate of microscopic findings of pulmonary lesion was recorded in cross breed animals 16.92% than local breed ones 13.77%. The difference in the rate between the two breed groups was statistically significant ($p<0.05$) as indicated in table 8. The occurrence rate of pulmonary lesions examined and the two breed types were studied and provided in table 7.

Table 8.The occurrence rate of pulmonary lesions examined microscopically in relation to age, BCS and bred of animals

Risk factor		N	number of positive	prevalence	X^2 (p-value)
Age	adult	133	15	11.26	4.34(0.048)
	Old	266	42	15.75	
BCS	poor	135	23	17.03	4.18(0.00)
	Moderate	161	25	15.52	
	Good	103	9	8.74	3.81(0.033)
Breed	local	334	46	13.77	
	Cross	65	11	16.92	
Total		**399**	**57**	**14.28**	

Gross lesion examination

Gross lesions **o**bserved during postmortem examination were localized on different lobes of the lungs according to the different gross lesion of the lung and the observed gross lesions were emphysema, abscess, pneumonia, hydatid lung, congested, hemorrhage, pleurisy, hepatisation

Figure1: Hydatid lung

Histopathological examinations

In this study, histopathological examination of all infected lungs revealed basically different microscopic lesions such as; different types of pneumonia were microscopic lesions with exudates in the alveoli, bronchioles and bronchi, congestion of blood vessels, hemorrhages. Bronchopneumonia with abundant neutrophills and few macrophages within the lumen of bronchi, bronchioles and alveoli and also interstitial pneumonia with thickening of alveolar wall due to mononuclear cells or fibroblasts were observed.

Discussion

In this study, the overall prevalence of gross lesion of the lung was 22.80%. In fact, the rate recorded in the present study, there is no adequate data so far done on gross and histopathological examination on pulmonary lesions at cattle. A few data available were on small ruminants in a single gross and microscopic vision. In this study, statistically significant (P<0.005) association was observed between the age of the animal and gross lesion findings with the highest rate in old 26.31% and lower in adults 15.78% . This might be due to the fact that, reduction of immunity system of animals occurs as the animals get old, which makes the animal more susceptible or predispose to a variety of infection or favors for pulmonary lesion formation. From this recorded rate in old animals examined with gross lesions, slightly highest rate was recorded in hydatidosis 19(7.11%) which was lower than Yetnayet, 2010(27.2%), 6.05% pneumonia , 3.70% emphysema, 3.01% congestion, 1.8% pleurisy and hemorrhage, 1.51% abscess with highest rate being in animals from Kedir, (2010) (11.51%) and 1.11% calcification.

This study has also shown statistically significant (P<0.05) association among the three body condition scores on animals and gross lesion findings with highest rate in poor body condition (25.18%), followed by moderate (22.36%) and good (20.38%) the highest rate in poor body condition might be association with the difference in determining the body condition score and the sample size. This slightly increased prevalence in our study in poor body condition could be from the fact that poor nourished animals would be less competent in getting rid of infection, but it is not un usual for well-fed animal to surrender the disease provided at the right environmental conditions are, made available (Radostits *et al* ., 2007).

This study has shown statistically significant (P<0.05) association between the two breed types of animal and gross lesion findings of bovine lung slightly higher rate was observed in local bred animals (23.35%) with slightly lower cross breed (20%) this slight variation in prevalence of gross lesions of the lungs could be due to the difference in the micro environment of the animal brought and the rate of exposing to the risk factors.

Pathological features of lung with various microscopic lesions were observed in the present study important gross lesions of detected during post mortem examination include pneumonia, emphysema, congestion, hydatidosis which have been seen frequently along caudal, ventral, cranioventral and at different aspects of the lobe of the even this coincides with McGavin and Zacchary (2007).

In histopathological examination, from lungs with various gross lesions, 57(62.26%) were found with various microscopic lesions, the rest should negative result might be due to artifacts and distortions caused by tissue processing this finding is in agreement with that of Junquera *et al*., (2005) reported in several steps of this procedure the tissue may be distorted due to shrinkage by fixatives which results appearance of artificial spaces between cells and other tissue components.

In the current study, there was statistically significant association (p<0.05) between the microscopic lesion and age difference of the animal. The highest rate was observed in old animals (15.74%) and adult (11.26%) the rate of pneumonia was found higher in microscopic examination from the 22(5.51%) pneumonic gross lesions examined, 16(28.07%) were found microscopically, and from this 9(15.78%) were interstitial pneumonia and 7(12.28%) were found bronchopneumonia.

The microscopic appearance agrees with Mohammed (1999) who reported that in interstitial pneumonia, there is thicken alveolar wall due to monoclonal cells and fibroblasts and in bronchopneumonia there is abundant neutrophills and macrophages within the lumen of bronchi, bronchiole and alveoli, followed by hydatidosis which were found from the 20(5.00%) hydatid gross lesion lung examined, 10(17.54%) were found microscopically, from 16(4.01%) lungs with emphysema gross lesion lung, 8(14.03%) were microscopically found and from this 5(8.77%) were

intestinal emphysema, and 3(5.26%) were alveolar emphysema examined microscopically (Jubb *et al.*, 2007). This study has also shown statically significant ($P<0.05$) association between histopathology lesion and the body condition scores of the animal. Slightly highest rate was observed in poor body condition (17.03%), followed by moderate (15.52%) and good (8.74%). In this study, the rate of microscopic lesions of bovine lung was compared in two breeds. The highest rate 16.92% was observed in cattle with cross breeds and 13.77% in local breeds this might be due to the fact that, cross breeds have getting the chance of acquiring infection that predispose to the pulmonary diseases due to reduced immunity development by the animal.

Conclusions

The present study has shown moderate prevalence of gross and histopathological examination of pulmonary lesions in cattle slaughtered at Gondar ELFORA abattoir. Identified gross lesion during the study were Emphysema, pneumonia, hydatidosis, congestion, abscess, hemorrhage, calcification and pleurisy and microscopic lesions such as bronchopneumonia, interstitial pneumonia, alveolar emphysema, interstitial emphysema , abscess, hydatid lung, calcified lung congested lung, hemorrhage and pleurisy were also identified . No matter how the moderate prevalence rate has recorded in this study, there was no study so far done on gross lesion and histopatholgical examination on pulmonary lesions rather, few studies done so far on specific gross lesions of the lung on small ruminants. Therefore; there was no adequate data available in light of these conclusions, the following points are forwarded:

Pathological and histopathological examination should be done to establish the reliable data in the abattoirs. Epidemiological survey should be conducted on the different causes of pulmonary diseases in relation to the controlling mechanism; and most gross lesions occur following secondary infection or other predisposing factors, emphasis should be given for minimizing predisposing factors and infections.

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