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「Short Communication」

Pulmonary diseases in slaughtered cattle 4. Pathology of pulmonary lesions

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Abstract

A study of pulmonary diseases in the slaughtered cattle (n = 125) of Mymensingh town was conducted to study pathological findings using the standard methods from September 2001 through April 2002. The pulmonary lesions observed in this study included congestion, emphysema, anthracosis, pleuritis abscess and hemorrhage. The histopathological findings of congestion were characterized by hemorrhage, a large number of leukocytes infiltration in the lumen of the alveoli, bronchitis, bronchiolitis, proliferation of fibrous connective tissue and hyperplasia of bronchiolar epithelia. Histopathologically, emphysema was identified by the distended alveoli with thin and atrophied alveolar walls. In anthracosis, carbon particles were found in stroma and alveolar lumen. In pleuritic lesions, there was a proliferation of fibrous connective tissue along with the infiltration of mononuclear reactive cells. Abscesses were characteristic of the accumulation of neutrophils surrounded by immature fibroblasts forming a capsule like structure.

Key words : Pulmonary diseases, Slaughtered cattle, Bangladesh

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Introduction

The information on the various aspects of respiratory diseases in cattle and other animals has been reported from many countries of the world[1,2]. The frequency, seasonal distribution and pathology of pulmonary diseases in Bengal goats of Bangladesh have been reported by a few investigators[3-6]. However, the pathology of bovine pulmonary lesions and diseases have not been yet reported in Bangladesh. Thus, this study was designed to describe the gross and histological findings for the information of a few diseases in bovine lungs.

Materials and Methods

Physical examination of lungs

The bovine lungs (n = 125) were examined in the laboratory for gross lesions. The lesions were identified by their physical characteristics. Number, size, shape and other characteristics of lesions were recorded in sketch cards specifically designed for the purpose. The severity of pulmonary lesions was determined on the basis of size and a number of lesions as well as parts of lungs affected by individual lesions.

Histopathological study

The gross lesions of lungs were noted and suspected tissues along with normal part were cut into small pieces (about 1 to 2 cubic cm) and fixed in 10% buffered neutral formalin solution. The well fixed tissues were then washed in running tap water for 24 hours and dehydrated through a series of ascending grades of ethyl alcohol (70%, 80%, 95% and 100%). The tissues were cleared by two changes of chloroform and impregnated with two changes in paraffin at 58℃. Finally, they were embedded in liquid paraffin (58℃). The specimens in paraffin block were sectioned at 4 to 6 μm rotary microtome and placed in water bath (37-40℃) for spreading and the sections were taken on grease free clean glass slides and dried in air. The histologic sections were stained with Mayer's hematoxylin and eosin (H & E) following the routine procedure of histopathological studies[7]. The stained sections were then permanently mounted in Canada balsam with a cover slip.

Results and Discussion

Gross findings

The pulmonary lesions observed in this study included congestion, emphysema, anthracosis, pleuritis, abscess and petechial hemorrhage. Pleuritis was characterized by thick pleura. Firm nodular structures were observed in the abscesses. The lesions of anthracosis were showed with black discoloration on the lung surface. The location of lesions in the lungs is shown in Table 1. The diaphragmatic lobes were affected by all the pulmonary lesions. The congestion and emphysema were generally distributed as well.

The severity of lesions is shown in Table 2. The frequently noted pulmonary

cases were congestion (63 cases, 50.4%) and emphysema (26 cases, 20.8%) followed by anthracosis, pleuritis, abscess and petechial hemorrhage.

Histopathological findings

The histopathological findings of congestion were variable. Severe pneumonia was recorded in some cases. The predominant histological lesions were hemorrhage and huge number of leukocytes infiltration in the lumen of alveoli. Some cases were diagnosed histopathologically as bronchitis characterized by infiltration of leukocytes in the wall of bronchus as well as in the lumen of bronchus.

Bronchitis and pneumonia were found simultaneously in some cases in which the main pathological lesions were infiltration of leukocytes in the wall of bronchus and in the lumen of alveoli. In addition, there were congestion and haemorrhage. In a few cases, bronchiolitis and pneumonia were similar to bronchitis in histologic examination.

In some cases, the proliferation of fibrous connective tissue and the hyperplasia of bronchiolar epithelia were recorded and these cases were diagnosed as chronic bronchiolitis. In emphysematous areas, many alveoli were distended and showed as wide opening into each other or into a common space due to the replacement of alveolar walls. The alveolar walls were thin and atrophic.

In cases of the anthracosis carbon parti cles in stroma and alveolar lumen were observed. In some lesions, there was an infiltration of mononuclear cells along with carbon particles.

In pleuritic lesions, there was a proliferation of fibrous connective tissue along with infiltration of mononuclear reactive cells. Abscesses were characterized by an accumulation of neutrophils surrounded by immature fibroblast cells forming a capsule like structure.

There were six pulmonary lesions recognized in this study : congestion, emphysema, anthracosis, pleuritis, abscess and petechial hemorrhage. All the pulmonary lesions were observed in diaphragmatic lobes with a generalized distribution of congestion and emphysema.

Table 1. Distribution of bovine lung lesions

Distribution of the lobe	No of cases					
	Congestion	Emphysema	Anthracosis	Pleuritis	Abscess	Petechial hemorrhage
Generalized	21	10	–	–	–	–
Right apical	8	8	–	–	–	1
Left apical	8	9	–	–	–	1
Right cardiac	7	–	–	–	1	–
Left cardiac	4	–	–	–	–	1
Right diaphragmatic	11	2	6	7	3	2
Left diaphragmatic	11	3	7	11	3	1

Table 2. Severity of bovine pulmonary lesions(n=125)

Pulmonary lesions	Mild		Severe		Total	
	No cases	%	No cases	%	No cases	%
Congestion	22	17.6	41	32.8	63	50.4
Emphysema	21	16.8	5	4.0	26	20.8
Anthracosis	4	3.2	8	6.4	12	9.6
Pleuritis	5	4.0	6	4.8	11	8.8
Abscess	7	5.6	0	0.0	7	5.6
Petechial hemorrhage	6	4.8	0	0.0	6	4.8

The major lesions of congestion were severe, but, majority of the emphysematous lesions was mild. The pulmonary lesions recorded in this study were also reported in the other litera- ture[8-13].

Histopathological study of present cases of congestion indicated severe pneumonia, bronchitis, acute and chronic bronchiolitis. Radostits et al[12] also reported that the early stages of most cases of pneumonia were associated with pulmonary congestion.

Gross lesions specifically related to parasitic bronchitis could not be established in this study. In addition, contrary to the other reports[10,14,15], microscopically, evidence of parasitic bronchitis was not obvious in the present cases. These results were probably responsible for mild infection with few adult worms and mild clinical signs in mature slaughtered cattle associated with quick development of acquired immunity in endemic areas [14,16]

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