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Prevalence and pathomorphology of circulatory disturbances in sheep

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Abstract

A total of 988 slaughtered or spontaneously dead sheep were screened. Circulatory disturbances were observed in 37 (19.79%) cases out of 187 lungs examined that included pulmonary congestion, haemorrhage and edema. Pulmonary congestion and haemorrhage were encountered in 19 (10.16%) cases. Grossly, areas of congestion and haemorrhages were observed throughout the lung. Microscopically, areas of haemorrhage in the alveolar spaces were noticed. Pulmonary edema was observed in 18 (9.63%) cases. Grossly, the affected lungs were pale and heavy. Upon incision, foamy, edematous fluid oozed out from trachea, bronchi and bronchioles. Microscopically, eosinophilic homogenous fluid was noticed in the alveoli.

Keywords: Circulatory disturbances, pulmonary congestion, haemorrhage and edema.

Introduction

The respiratory system in general constitutes the most extensive surface and gets exposed directly to the environment. Any sudden change in the environment precipitates the infection by interfering with the local defence and rendering the system more susceptible to infections.Various infectious and non - infectious agents can damage lungs and produce significant lesions. Non infectious conditions includes pulmonary edema, congestion and haemorrhages. In pulmonary edema, edematous fluid act as good medium for growth of microorganisms and so pneumonia is a frequent sequel.

Materials and Methods

Lung samples were obtained from different slaughter houses located in and around Vijayawada and Tirupati apart from the animals necropsied in the Department of Veterinary Pathology, N.T.R College of Veterinary Science, Gannavaram and from field mortalities during the period of June 2013 – July 2014. A total number of 988 sheep were examined for lung lesions. Among them specimens showing gross pathological lesions were collected and fixed in 10% neutral buffered formalin for 24 hrs, dehydrated in a graded series of alcohol and embedded in paraffin. Sections of 4-5µ thickness were cut through microtome and sections were stained by routine Haematoxylin and Eosin for detailed histopathological studies.

Results

The circulatory disturbances observed were pulmonary congestion, haemorrhage and edema in 37 (19.79%) cases out of 187 lungs examined in the present study.

Pulmonary congestion and haemorrhage were encountered in 19 (10.16%) cases out of 187 sheep lungs examined. Grossly, areas of congestion and either petechial or ecchymotic haemorrhages were

observed throughout the surface in all the lobes of both the lungs (Fig.1). Microscopically, engorged blood vessels, capillaries and areas of haemorrhage in the alveolar spaces were observed (Fig.2).

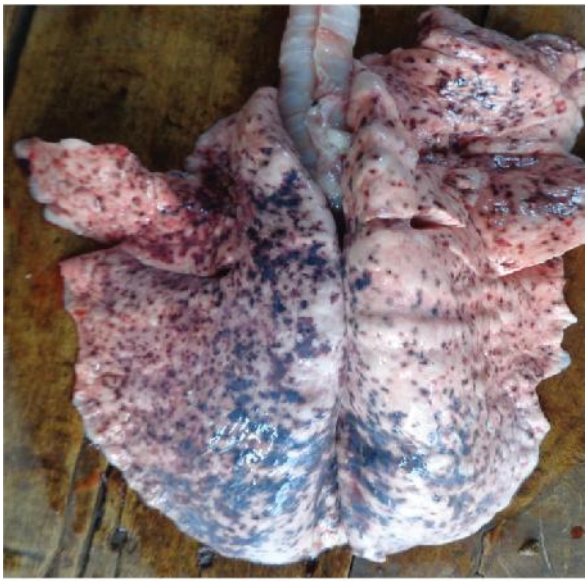

Figure. 1 Note the areas of congestion and petechiae scattered throughout the lungs.

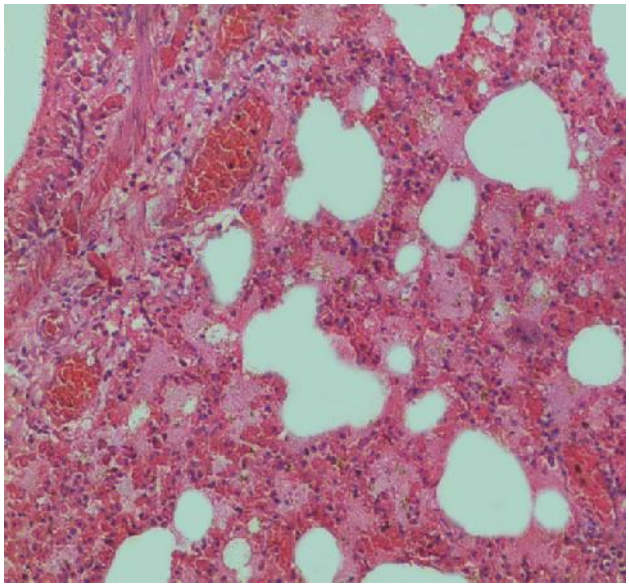

Figure 2 Lung section showing engorged blood vessels, alveolar capillaries and haemorrhages within alveoli H&E X 100.

Pulmonary edema was observed in 18 (9.63%) cases out of 187 sheep lungs examined. Macroscopically, the affected lungs were pale and heavy. Upon incision, foamy, edematous fluid oozed out from trachea, bronchi and bronchioles (Fig.3). Microscopically, eosinophilic, homogenous fluid was noticed in the alveoli and in the interalveolar septa (Fig.4).

Figure 3 Cut section of the lung showing frothy, edematous fluid oozing out from trachea and bronchi.

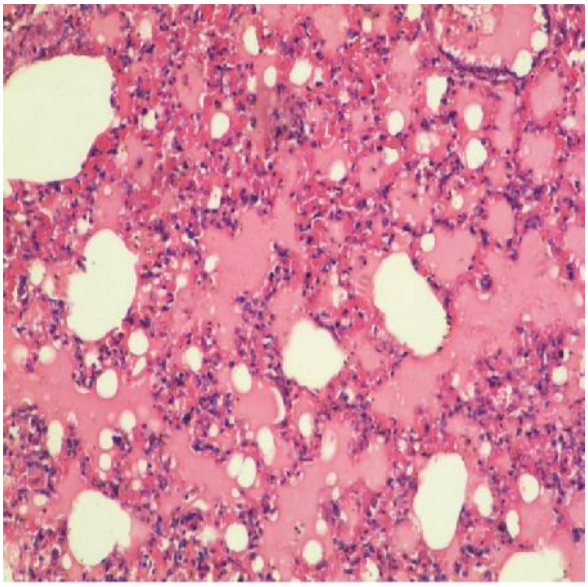

Figure 4 Lung section showing homogenous, eosinophilic fluid in the alveoli H&E x100.

Discussion

Pulmonary congestion and haemorrhage was encountered with an incidence of 10.16% in the present study which was similar with the earlier report of 9.84% by Dar *et al.*, (2013a) in India. However, the incidence observed was lower compared to the findings of Sriraman and Rama rao (1980), Priyadarshi *et al.*, (2013) and higher when compared to that of Kumar *et al.*, (2005), Regassa *et al.*, (2013) and Belkhiri *et al.*, (2014).

In the present investigation, lesions of congestion and haemorrhage comprised of red, patchy areas, petechial and ecchymotic haemorrhages grossly. Microscopically, engorged blood vessels and erythrocytes in the lumen of the alveoli were noticed. The lesions observed were in accordance with the observations of Kumar *et al.*, (2005) and Priyadarshi *et al.*, (2013).

Pulmonary congestion is always a passive process resulting from defective venous return from the lungs. In congestion, the vascular endothelium undergoes degenerative changes due to inadequate amounts of oxygen and nutrients. The damaged vascular wall may rupture and cause haemorrhages too. Pulmonary haemorrhage might be due to trauma, congestive heart failure, infectious diseases, disseminated intravascular coagulation (DIC), coagulopathies and septicemias etc. Pulmonary haemorrhages are always serious,

which may fill and obstruct the airways, preventing the entry of air with resultant suffocation of the animal (Thomson, 1988).

In the present research, an incidence of 9.63% of pulmonary edema observed in sheep was similar to the earlier report of 10.90% by Priyadarshi *et al.,* (2013). However, Sriraman and Rama rao (1980), Kumar *et al.,* (2005), Dar *et al.,* (2013) and Belkhiri *et al.,* (2014) reported a lower incidence of pulmonary edema in slaughtered sheep.

Grossly, pale and heavy lungs that revealed foamy, edematous fluid on section and presence of homogenous, eosinophilic fluid in the alveoli microscopically were observed in pulmonary edema cases. The gross and microscopic findings were in agreement with the earlier reports of Kumar *et al.,* (2005) and Priyadarshi *et al.,* (2013).

Alveolar edema always accompanies viral diseases, toxic pulmonary diseases, exposure to bacterial toxins and anaphylactic shock. Permeability edema may be due to damage in the endothelium and pneumocytes or due to release of chemical mediators of inflammation or it might be because of exposure to bacterial toxins, DIC etc. (McGavin and Zachary, 2007).

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