



# **Classification of Pneumonic Sheep Lung From Slaughterhouse According to Histopathology**

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# Introduction

- Pneumonia is considered as one of the most common disease affecting sheep.
- Its responsible for major economic losses through high lamb mortality rates, reduced weight gain, condemnation of lungs in slaughterhouses.
- In addition to the cost of medical therapy and vaccinations against infectious causes of pneumonia (Jones et al., 1982; Goodwin et al., 2004).

# Introduction

- Respiratory disease may occur by many type of microorganism that depend on several factor such as:
  1. Age
  2. Species
  3. Climate
  4. Geographic area
  5. Hygiene of environment
  6. Stressful factor including overcrowding and transporting (Ayelet et al., 2004).

# Introduction

- The infectious causes of pneumonia include primarily activation of normal inhabitant bacteria in respiratory tract (specifically nasopharynx) when resistance of respiratory tract is lowered so that bacteria move downward until reach to the lungs and causing pneumonia.
- These infectious agents include:
  1. *Pasteurella* species
  2. *Mycoplasma*
  3. *Arcanobacterium pyogenus*
  4. *Streptococcus*
  5. *Staphylococcus aureus*
  6. *Klebsilla pneumoniae* (Andrews et al., 1997).

# Introduction

- Pneumonia can also be caused by viruses such as:
  1. *Paramyxovirade* genus *Orbivirus* .
  2. *Parainflunza* .
  3. *Reovirus* .
  
- In addition to this, parasitic infestations include *Dictyocalus Viviparous* and *D. Filarial* are considered as the main parasites of lung in sheep (Andrews et a., 1997)

## **Aims**

The aims of this study is to determine the pathological classification of pneumonia in sheep's lungs slaughtered.

# Methodology

- In this study, samples from 15 sheeps showing lung lesions were collected regardless of the age or sex.
- Samples were collected from slaughter houses directly after slaughter and evisceration.
- In addition, portions from affected lungs lobes were sent in 10% formalin for histopathological examination.
- After fixation, the tissue were dehydrated in graded alcohol (70-100%); cleared in xylene, embedded in paraffin wax, sectioned (5 $\mu$ m) using microtome, mounted on slides and differentially stained with *Haematoxylin and Eosin*. Slides were examined with Olympus light microscope.



# Result

- The lungs of 15 sheep cases were affected at gross level by various types of pneumonia and pulmonary abscesses.
- Pneumonias were classified into 3 subgroups according to their macroscopic appearances (texture, exudation and distribution of lesions) and microscopic findings .
- The morphologic diagnosis in the 15 cases of ovine pulmonary lesions examined are given in the following Table.

Type of lesion	Number of affected animals	
Interstitial Pneumonia	7	( 46.6%)
Suppurative Pneumonia	5	( 33.3%)
Embolic Pneumonia	1	(6.6%)
Granulomatous Pneumonia	2	(13.5%)

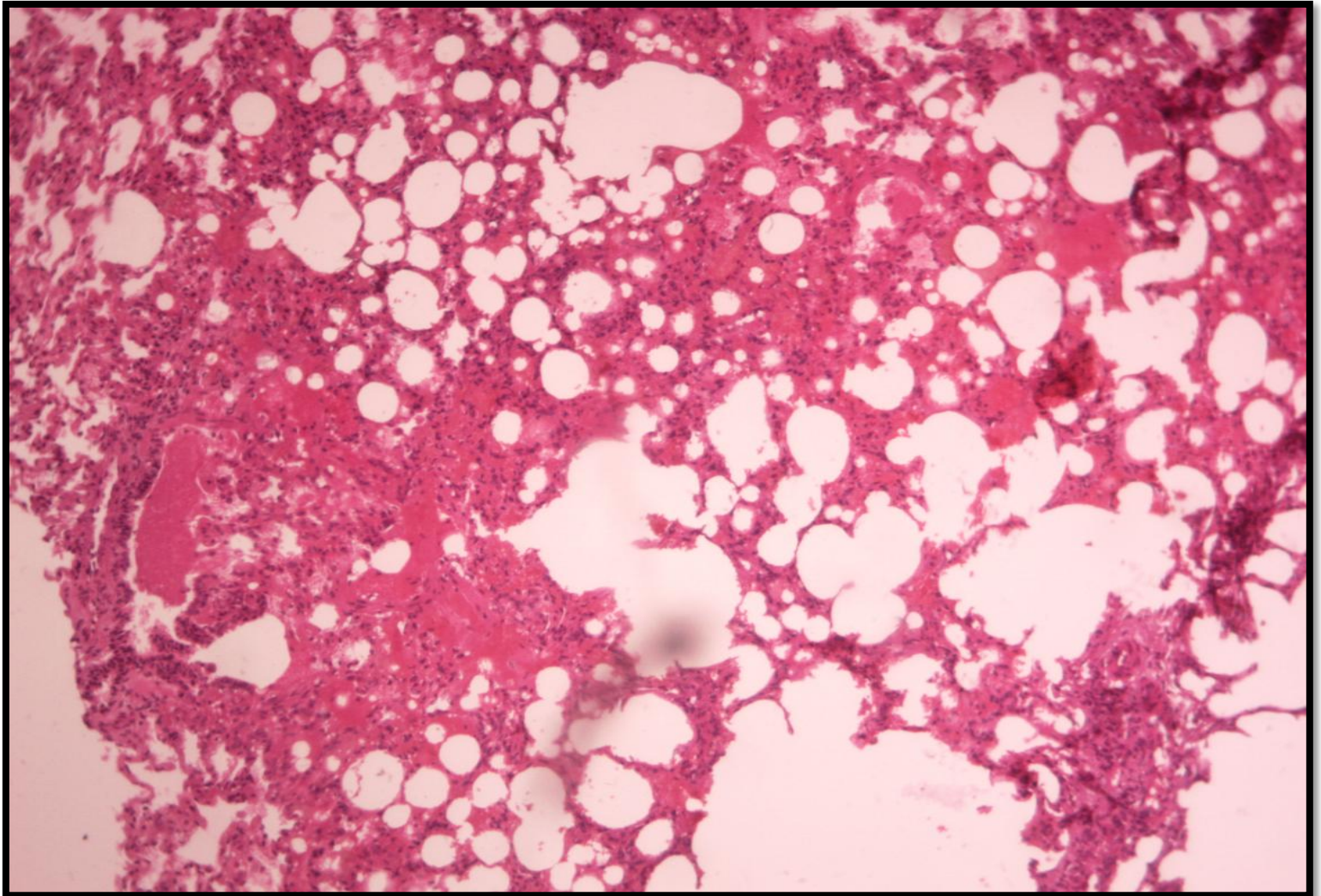
# Interstitial pneumonia:

- 7 animals (46.6%) showed interstitial pneumonia.
- The gross lesions were distributed throughout the lungs, lungs were enlarged and were diffuse red to pale in appearance.
- Rib impressions were seen on the costal surfaces of the diaphragmatic lobes. The affected lung failed to collapse if pressed
- The histopathological examination of the affected lungs showed a marked increase in mononuclear cells and in the interalveolar septa. In some cases, hyperplasia of pneumocyte type II was seen. In addition, there was no exudate in the alveolar spaces and airways.



**Figure. Macroscopic appearance of interstitial pneumonia. Affected lung is pale, enlarged, uncollapsed and rib impressions are observed on diaphragmatic surface.**





**Microscopic appearance of interstitial pneumonia showed a marked increase in mononuclear cells and in the interalveolar septa. There was no exudate in the alveolar spaces and airways.**

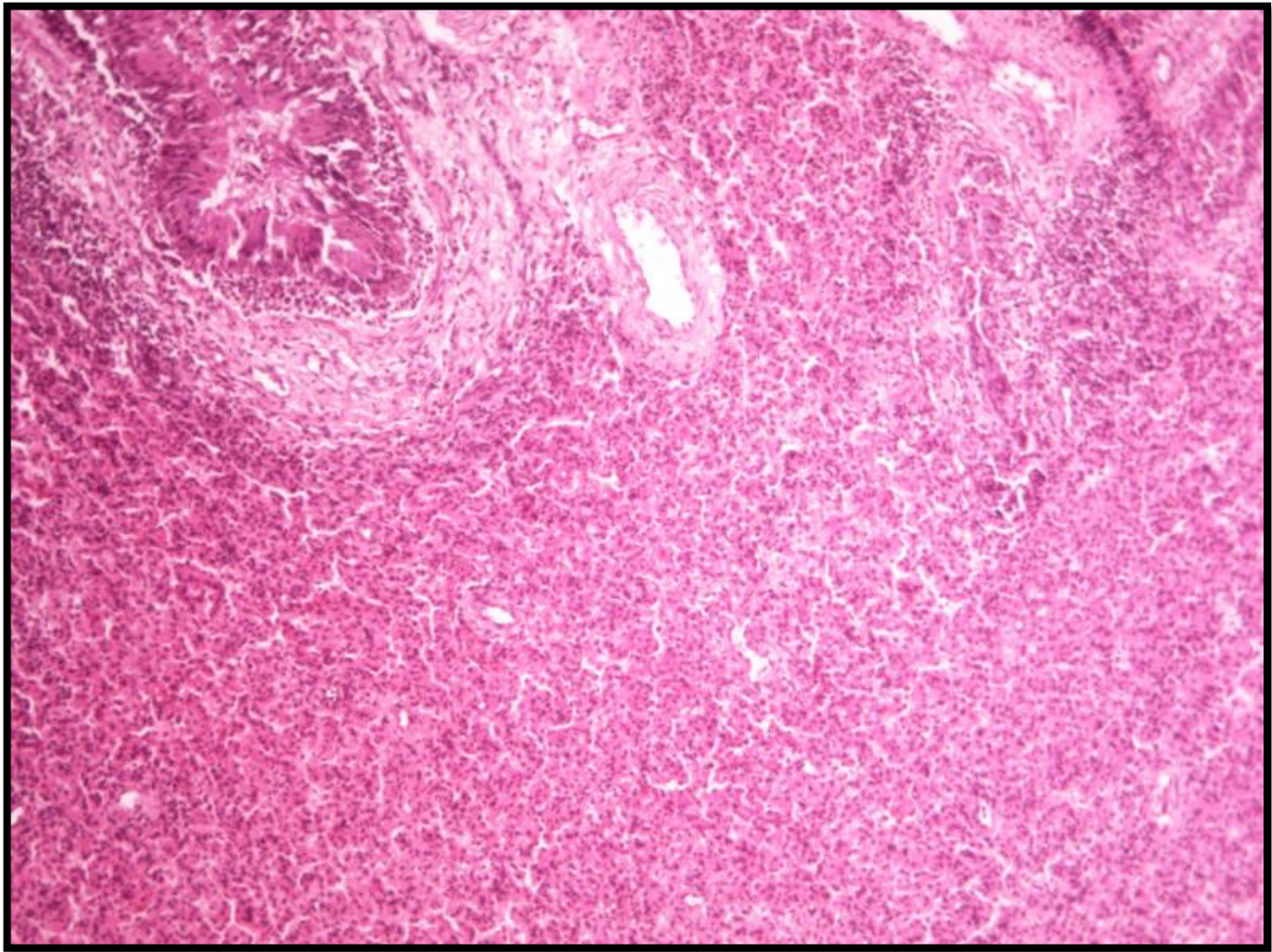
## **Suppurative bronchopneumonia:**

- Suppurative bronchopneumonia was encountered in 5/15 (33.3%).
- The gross appearance showed consolidation involving different lung lobes. The pulmonary parenchyma was firm in texture and dark red in acute to grey-pink and grey in chronic form.
- Histopathologically, neutrophil-rich exudates were present in the alveolar spaces and lumens of the bronchioles and bronchi, and in some occasions an admixture of various amounts of cell debris.



**Macroscopic appearance of bronchopneumonia. Dark red consolidation of cranioventral lobes (arrow).**



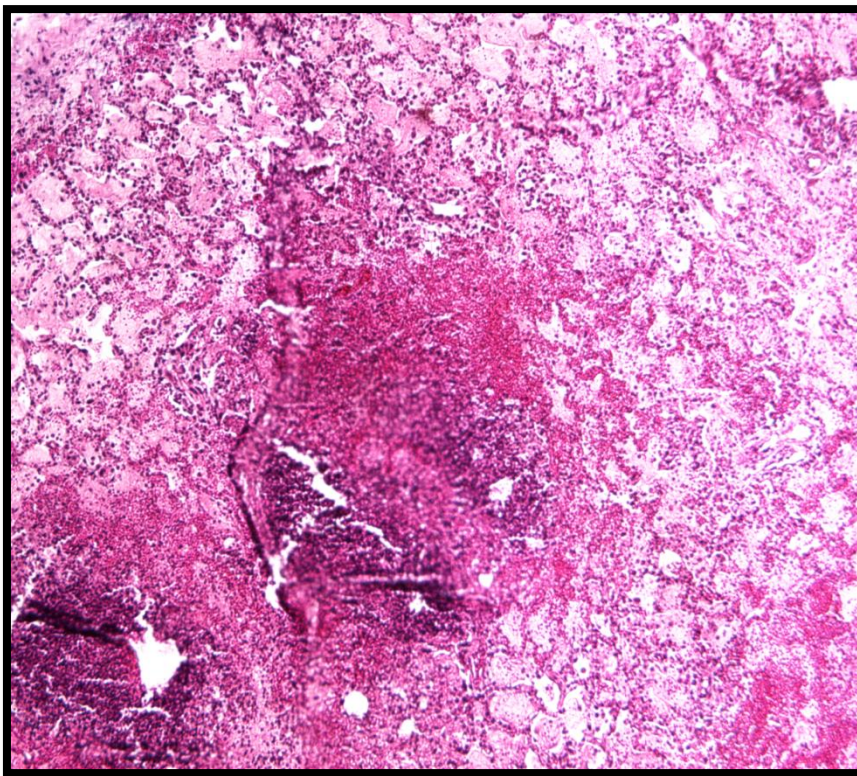


**Microscopic appearance of bronchopneumonia. A neutrophil-rich exudates filling the alveolar spaces and lumens of the bronchioles and bronchi.**

## **Embolic pneumonia:**

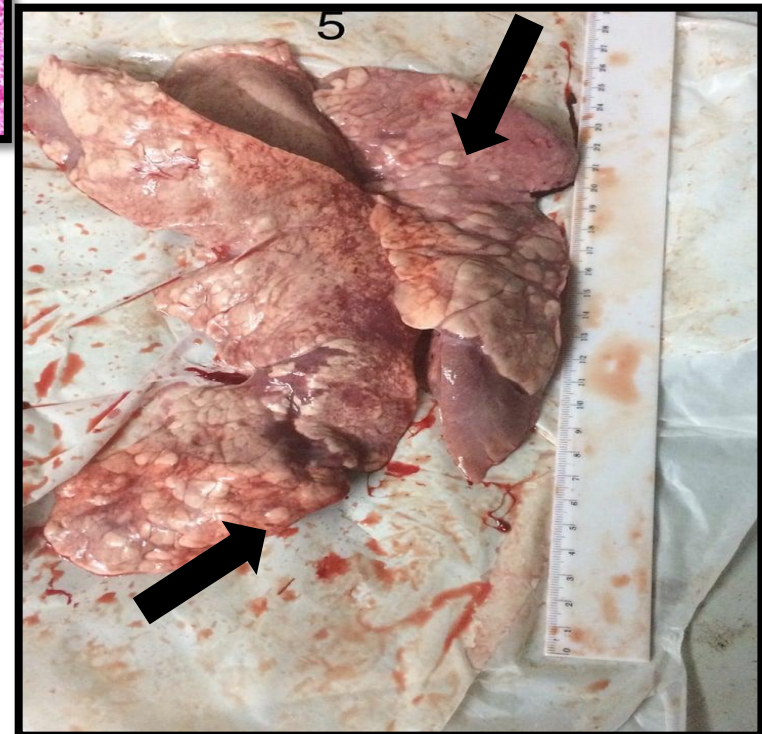
- Embolic pneumonia was detected in 6.6% (n = 1/15).
- The affected lungs showed multifocal nodules of the same size distributed randomly throughout the pulmonary lobes.
- Microscopically, these nodules showed multifocal neutrophilic aggregations that were randomly scattered throughout the pulmonary lobes.



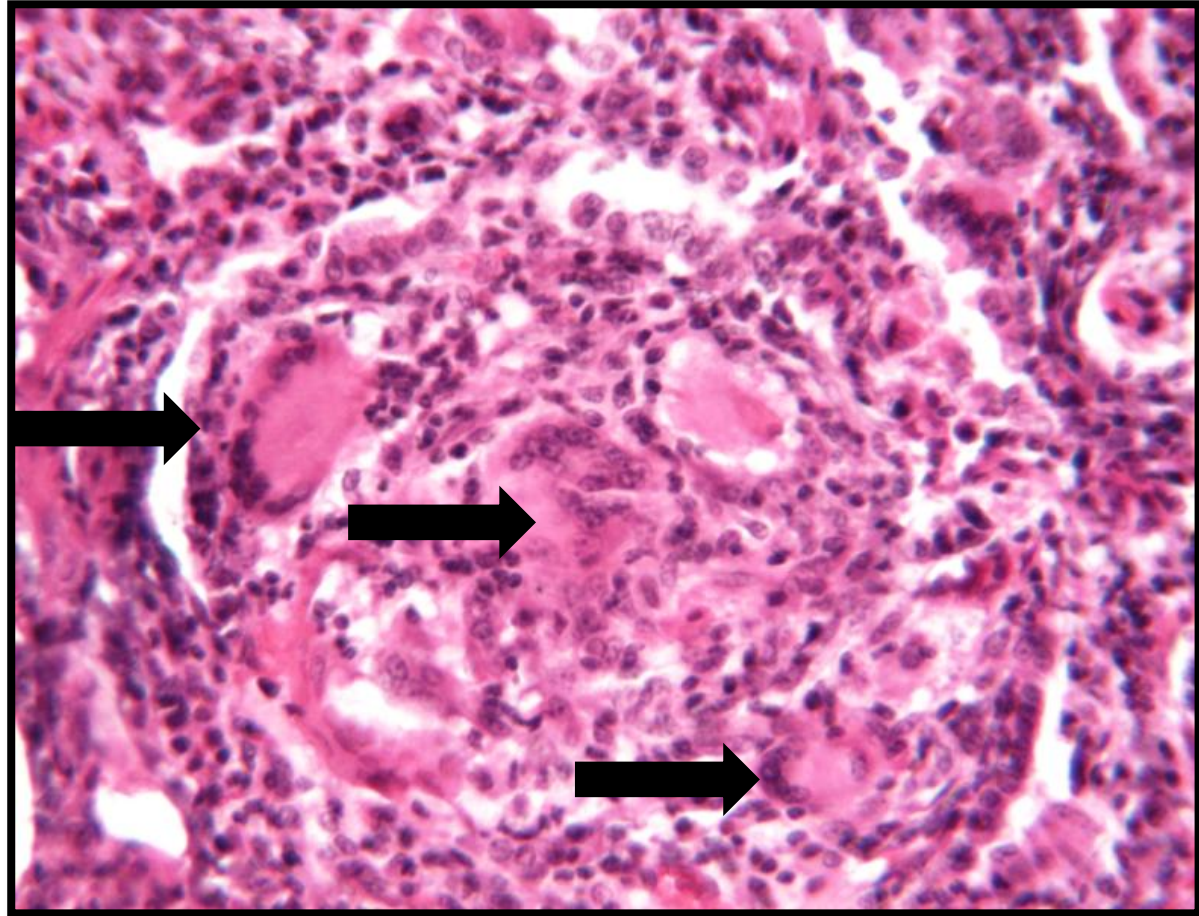


**Microscopic appearance of embolic pneumonia showing multifocal aggregation of neutrophils mixed with large amount of cell debris and surrounded by areas of hemorrhage.**

**Macroscopic appearance of embolic pneumonia. White, raised foci of 2-4 mm in size are observed throughout pulmonary lobes (arrows).**



# Granulomatous pneumonia:



**Granulomatous inflammation. Mixed populations of lymphocytes, macrophages and multinucleated giant cells (*arrows*) surround a necrotic focus**



# Discussion

- Respiratory diseases are common in various species of domestic animals particularly the herbivores.
- Because of its major economic impact on the sheep industry, through consequences such as death, retarded growth and reduced weight-gains in recovered animals, slaughterhouse wastage, drugs and labour costs (Daniel et al., 2006).
- Bacterial pneumonia can lead to greatly decreased growth performance of the animals (Daniel et al., 2006)

# Discussion

- The present study was designed to classify the histopathological pattern of ovine pulmonary lesions from slaughter houses.
- In previous studies the respiratory lesions in sheep showed that purulent pneumonia (48%), fibrinous pneumonia (12%), interstitial pneumonia (5%), giant cell pneumonia (3%), verminous pneumonia (3%) and mycotic pneumonia (2%) were the main types of pneumonia in that farm (Ikede et al., 1978).
- The organisms isolated from the pulmonary lesions of the above study included *M. haemolytica*, *E. coli*, *Klebsiella* spp., *Staphylococcus* spp., *Mycoplasma arginine* and *Aspergillus fumigatus* (Ikede et al., 1978).

# Discussion

- In our study, of 15 lungs examined, all cases showed gross lesions of various types of pneumonia and pulmonary abscesses.
- Pneumonias were classified into 4 subgroups according to their macroscopic and microscopic appearances, including suppurative bronchopneumonia (33.3%), interstitial (46.6%) and embolic pneumonia (6.6%).
- Because of financial limitations, it was not possible isolate the bacteria from collected samples.

# Conclusion

- Suppurative and interstitial bronchopneumonia was the most common to occur in small ruminant and was the cause to reduce of weight gain, loss of production, and economic loss.

# Future work

- Microbiological culture to determine the bacteriological causes of pneumonia.
- Sensitivity test to determine the most effective treatment

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*Thank  
you*

