



ISSN (E): 2277-7695
ISSN (P): 2349-8242
NAAS Rating: 5.23
TPI 2022; SP-11(7): 1764-1766
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www.thepharmajournal.com

Received: 26-04-2022

Accepted: 29-05-2022

Deepak Gill

M.V.Sc., Department of
Veterinary Pathology, CVAS,
Navania, Udaipur, Rajasthan,
India

Rohitash Dadhich

Assistant Professor, Department
of Veterinary Pathology,
PGIVER, Jaipur, Rajasthan,
India

Nikhil Shringi

Assistant Professor, Department
of Veterinary Anatomy, R.R.
College of Veterinary and Animal
Science, Deoli, Rajasthan, India

Amit Chotiya

M.V.Sc., Department of
Veterinary, Biochemistry,
CVAS, Bikaner, Rajasthan,
India

Vikas Kumar

Assistant Professor, Arawali
Veterinary College, Sikar,
Rajasthan, India

Histopathological studies of emphysema and atelectasis in lungs of goats in southern region of Rajasthan

Deepak Gill, Rohitash Dadhich, Nikhil Shringi, Amit Chotiya and Vikas Kumar

Abstract

The present investigation was carried out from January 2016 to December 2016. During this period a total number of 1157 lower respiratory tract samples of goats (irrespective of sex, age groups, and breeds) were examined. Out of these, 633 lower respiratory tract samples showed gross lesions, which were subjected to histopathological examinations. The occurrence of pulmonary emphysema was observed as 7.11 per cent, & Atelectasis 4.89 per cent in Udaipur, Dungarpur, Chittorgarh and Rajsamand district of Rajasthan.

Keywords: Goat, Southern Rajasthan, histopathology, lungs, emphysema & atelectasis

Introduction

The Goat population in India is the 148.88 million (highest in Rajasthan, 20.84 million) showing an increase of 10.1% over the previous census (20th livestock census). Goats were among the first farm animals to be domesticated. As indicated by the archaeological evidence, they have been associated with man in a symbiotic relationship for up to 10,000 years (Ensminger and Parker, 1986) [4]. The diseases of respiratory system are the leading cause for mortality and morbidity in domestic animals with huge economic losses to farmers (Zachary and Mc Gavin, 2013) [15]. Respiratory diseases (pneumonia) were reported as the major causes of mortality in goats (Ameh *et al.*, 2000) [1]. Pneumonia can cause heavy economic losses to farmers including mortality, emaciation, poor growth gain, poor meat quality and condemnation of the affected lungs during meat inspection (Tijjani *et al.*, 2012) [14]. Small ruminants are especially important in the more extreme climates and they are noted for their ability to convert low opportunity cost feed in to high value products including meat, milk, fibre, manure and hides (Asaye and Alemneh, 2015) [2]. In southern Rajasthan, no study has been conducted to study the occurrence and pathology of lower respiratory tract conditions in goat. Therefore, it becomes pertinent to analyse Gross and histopathological changes of lower respiratory tract in goat in this region of Rajasthan.

Materials and Methods

The present study was carried out from January 2016 to December 2016. During this period a total number of 1157 goat lower respiratory tract samples of irrespective age, groups, sex and breeds were collected from various veterinary clinics and slaughter house of Udaipur, Dungarpur, Chittorgarh, and Rajsamand districts of southern Rajasthan and were submitted to the Department of Veterinary Pathology, College of Veterinary and Animal Science, Navania, Vallabh Nagar, Udaipur, for routine post-mortem examinations. Out of these, 633 samples showing gross lesions were further examined histopathologically.

The lung tissues measured 2-5 mm in thickness, presenting the lesions with normal tissue were used for fixation and pathological examinations. For histopathological examination, processing of tissues done by paraffin embedding using acetone and benzene technique (Lillie, 1965). The tissue sections of 4-6 micron were cut and stained with Hematoxylin and Eosin staining method as a routine (Luna, 1968) [10].

Result & Discussion

Out of these 1157 samples, 633 samples showed gross lesions were processed for subsequent histopathological examination. An overall occurrence of Pulmonary emphysema and atlectosis recorded as below table 1.

Corresponding Author

Deepak Gill

M.V.Sc., Department of
Veterinary Pathology, CVAS,
Navania, Udaipur, Rajasthan,
India

Table 1: Histopathological finding in Lungs of Goat

District & No of sample examined	Inflammatory conditions of lungs	
	Emphysema %	Atelectasis %
Udaipur (N=184)	13	8
	7.06	4.34
Dungarpur (N=182)	9	11
	4.94	6.04
Chittorgarh (N=153)	11	9
	7.18	5.88
Rajsamand (N=114)	12	3
	10.52	2.63
Total No of sample=633	45	31
Percentage	7.11	4.89

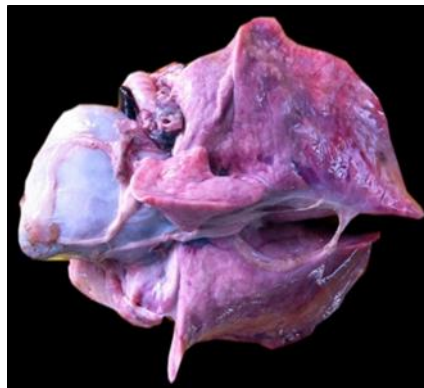
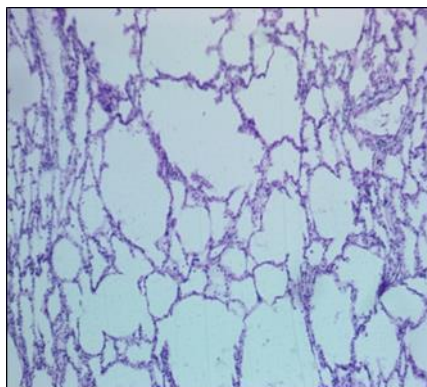
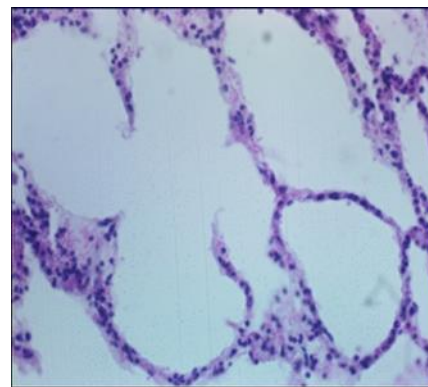
Pulmonary emphysema

The overall occurrence of this condition was observed in 45 cases (7.11 per cent) individually occurrence of this condition was observed in Udaipur, Dungarpur, Chittorgarh and Rajsamand as 7.06, 4.94, 7.18 and 10.52 per cent respectively. A similar occurrence was reported by Dadhich, H. (1993) as 7.35 per cent and Ferdausi *et al.* (2008) [5] as 6.7 per cent and higher occurrence was recorded by Rashid *et al.* (2013) [12] as 15 per cent. Grossly, lungs were voluminous pale and puffy. Some conditions the lungs totally filled the thoracic cavity and showed imprints of the ribs. On pressing (fig. 1). Microscopically, the alveoli were dilated with thin inter

alveolar septa. Many of the alveolar walls have ruptured and the adjacent alveoli have coalesced to form giant alveoli, adjacent to giant alveoli and collapsed alveoli was found. (Fig. 2 & 3) The recorded observations are well in accordance with those described by Samoon *et al.* (2016) [13], Medani *et al.* (2015) [11] and Jubb and Kennedy (2007) [6].

Atelectasis

The overall occurrence of this condition was observed in 31 cases (4.89 per cent) and individually occurrence of this condition was observed in Udaipur, Dungarpur, Chittorgarh and Rajsamand as 4.34, 6.04, 5.68 and 2.63 per cent respectively. A similar occurrence was recorded by Dadhich, H. (1993) as 4.20 per cent. A lower occurrence was observed by Kumar *et al.* (2014) [7] as 1.48 per cent. Grossly, affected lungs were homogenously dark-red and sunken relative to aerated lungs, and the texture was fleshy or firmer and non-spongy. (Fig.4) The cut surface revealed smooth and dry surface, leathery in consistency and the piece sank in water. Microscopically, the compressed lung appeared as slightly congested alveolar wall lying in close apposition with slit like residual lamina having sharp angular ends. Alveoli contained scanty oedema fluid and excess alveolar macrophages (figs. 5&6). These findings conformity with those of described by Kumar *et al.* (2014) [7], Dadhich, H. (1993) and Browin *et al.* (1991) [3].

**Fig 1:** Gross picture of emphysematous lungs, enlarged, pale and puffy appearance**Fig 2:** Microphotograph of lung showing emphysema, bullae formation by ruptured thin inter alveolar septa-H&E, 10x**Fig 3:** Higher magnification showing bullae formation by ruptured thin inter alveolar septa-H&E, 40x

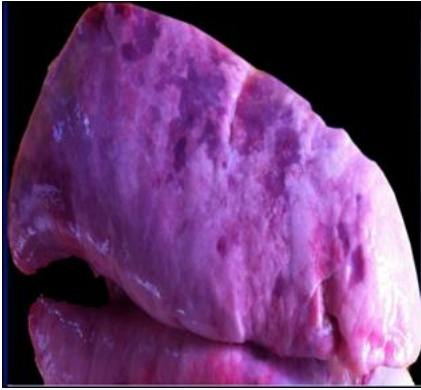


Fig 4: Gross picture of lung showing atelectasis, affected portion is homogeneously dark-red and shrunken relative to aerated lungs and the texture is fleshy or firmer and non-spongy

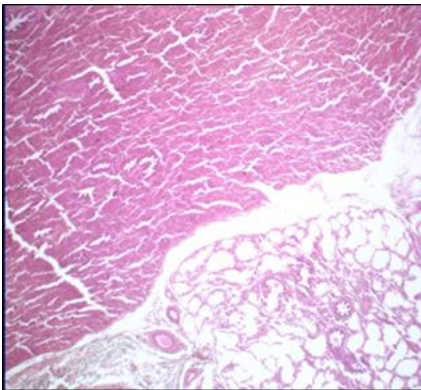


Fig 5: Microphotograph of lung tissue showing atelectasis, congested alveolar wall lying in close apposition with slit like residual Lumina and having sharp angular ends. -H&E, 4x

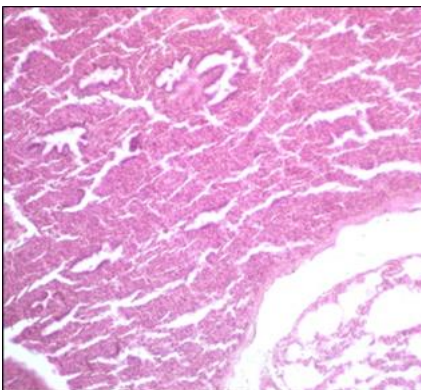


Fig 6: Microphotograph of lung tissue showing atelectasis, congested alveolar wall lying in close apposition with slit like residual Lumina and having sharp angular ends. -H&E, 10x

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