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Neeteesh Kumar

Department of Veterinary
Pathology college of Veterinary
science and AH Kumarganj
Ayodhya, Uttar Pradesh, India

D Niyogi

Department of Veterinary
Pathology college of Veterinary
science and AH Kumarganj
Ayodhya, Uttar Pradesh, India

Dharam Prakash Shrivastava

SMS, KVK, PG College Ghazipur
Uttar Pradesh, India

KK Tripathi

Department of Veterinary
Pathology college of Veterinary
science and AH Kumarganj
Ayodhya, Uttar Pradesh, India

Arunima Singh

Department of Veterinary
Pathology college of Veterinary
science and AH Kumarganj
Ayodhya, Uttar Pradesh, India

Akshith Tayagi

Department of Veterinary
Pathology college of Veterinary
science and AH Kumarganj
Ayodhya, Uttar Pradesh, India

Nikita Singh

Department of
Veterinary Obstetrics and
Gynecology, college of Veterinary
science and AH Kumarganj
Ayodhya, Uttar Pradesh, India

Corresponding Author:

Dharam Prakash Shrivastava
SMS, KVK, PG College Ghazipur
Uttar Pradesh, India

Prevalence and distribution of pneumonic lesions in Buffaloes

Neeteesh Kumar, D Niyogi, Dharam Prakash Shrivastava, KK Tripathi, Arunima Singh, Akshith Tyagi and Nikita Singh

Abstract

For this study, a total number of 180 cases of buffaloes slaughtered in the slaughter house of Unnao and Barabanki district of Eastern Uttar Pradesh was surveyed during the month from October, 2022 to March, 2023. Among the slaughtered 180 cases observed, 90 cases each were from both the districts. Total 34 cases (37.77%) and 26 cases (28.88%) of lung lesions were observed in Unnao and Barabanki districts respectively with overall prevalence of pneumonic lesion was 33.33%. In lung lesions, emphysematous lung was observed in 8 cases (8.88%) and 6 cases (6.66%), congestion with hemorrhagic lesions in lungs was in 14 cases (15.55%) and in 11 cases (12.22%) in Unnao and Barabanki district respectively. Two cases of (2.22%) of hard nodular growth/granulomatous lesions and one case of (1.11%) nodular lesions in the lung slaughtered in Unnao and Barabanki district was noticed. Pulmonary oedema was found in 6 cases (6.66%) and 5 cases (5.55%) in Unnao and Barabanki district respectively. No cases of pulmonary abscess and any other neoplasm except 2 cases of nodular growth along with fibrosarcoma in lungs in Unnao and one case in Barabanki district was found, in the gross examination of lungs. Maximum cases of congestion and Hemorrhages in lung were observed followed by emphysematous conditions and pulmonary oedema in the slaughtered animal in both the districts during the study period. Microscopic sections grossly classified as pulmonary emphysema revealed congestion of blood vessels, rupture of the alveoli with the formation of giant alveoli and remnant of alveolar wall to the adjacent alveoli. Hence, so many unhealthy/diseased Buffaloes meat should not be consumed or may be condemned as not fit for human consumption due to infections.

Keywords: Buffalo, lung lesions, pneumonia, slaughterhouse

Introduction

One of the most serious and common health problems affecting buffaloes is lung diseases. Lung disease, which can be acute or chronic, can lead to debility and death, which can result in significant financial losses. During carcass inspection, pathological evidence of severe infectious illnesses or disease states has been found. Based on the prevalence and spread of the disease, Asia-originating nations can be divided into three groups. These are nations that either have no endemic disease or where it is just clinically suspected (Benkirane and De Alwis, 2002)^[3].

One of the main bacterial infections responsible for these clinical symptoms is *Pasteurella multocida* (*P. multocida*) (Welsh *et al.*, 2004)^[14]. Both ante-mortem and post-mortem investigations should record any issues with meat cleanliness and possible consumer health risks. According to meat inspection data are a valuable information source in this situation and are crucial for epidemiology and preventive veterinary medicine. Through the production of animal products like milk, meat, wool, and other items, livestock is a substantial contributor to India's overall agricultural economy. According to Ewers *et al.* (2004)^[4] and Trevor *et al.* (2008)^[13], the majority of *Mannheimia spp.* is opportunistic infections that are frequently isolated from asymptomatic carriers. Due to the significant financial losses and associated expenses of care and prevention, respiratory illnesses are a critical issue that breeders face more than veterinarians. Cattle and buffalo appear to be more sensitive to inflammatory long illness when compared to other domestic species, probably as a result of a variety of physiological traits and functional variations in pulmonary defence mechanisms (Lay and Slauson, 1982)^[10].

Due to their morphological and anatomical qualities, the lungs are the organ that is most susceptible to invasions. According to Belkhiri *et al.* (2010) [2], the most significant element that aggravates and promotes lung disorders is the deterioration of sanitary conditions.

The diagnosis of bacterial pneumonia in buffaloes presents a substantial difficulty to the clinician. The doctor commonly uses a diagnostic laboratory since clinical indicators by themselves are not always diagnostic. So, in this study the animals included from the different slaughter houses that had respiratory symptoms or were suspected to have pasteurellosis. Considering the above facts, the present study was designed to study the prevalence of pneumonic lesions and its distribution in different lobes of lungs in buffalo slaughtered in slaughter houses.

Materials and Methods

(a) Collection of material

Morbid materials: The materials (Lungs and trachea) for the present investigation were collected from two buffalo slaughter houses. Among these abattoirs, one was from Unnao and the other was from Barabanki (U.P.). The tissue (Lung and trachea) were selected randomly without any biasness of sex, breed etc. Samples were collected for Six months from October, 2022 to March, 2023. The average age-group of the slaughtered buffalo was 8-12 years. Animals were carefully examined at the lairage to record the demographic data. At slaughter slabs, when the carcasses were bled and completely opened, the visceral organs were thoroughly examined by close inspection and palpation. Lungs suspected with pathological affections were isolated from the carcass and washed with water for detailed gross examination. Gross pathological lesions were recorded with the aid of an experienced pathologist following FAO meat inspection manual (Herenda *et al.*, 1994) [7]. From each and every suspected lung with pathological affections, samples were collected with the help of the butcher leader and city corporation meat inspector. The tissue samples collected from organized slaughter house of Unnao and Barabanki Districts were preserved in 10% buffered formalin and processed in Department of Veterinary Pathology, ANDUAT, Kumarganj, Ayodhya.

1. Tissue samples from lung and trachea for gross and histopathological study.
2. Lung pieces in sterile container for bacterial isolation.

b) Distribution of Lung lesion (Grossly)

Gross lesions in different visceral organs were noted immediately after opening the carcass at the slaughterhouse. The tissue samples were collected from cases showing gross lung lesions and classified accordingly. Lesions such as hyperemia, hemorrhages, edema, discoloration, solidness, or hardness were noted. The distribution of lesions in different lobes of the lungs was noted as: left apical, left cardiac, left diaphragmatic, right apical, right cardiac, right intermediate, and right diaphragmatic.

Histopathological study

Formalin-fixed tissues were processed by the routine acetone-xylene technique, impregnated, and embedded in paraffin wax. Sections were cut at 4-5 µm thickness with the help of a semi-automatic rotary microtome. The sections were stained

with haematoxylin and eosin (H&E) stain following the conventional procedure (Luna, 1968) [11].

Results and Discussion

The buffalo is the dairy, draught and meat animal of Asia. Buffalo plays a pivotal role in the livelihood of many people in the country as well as in the globe especially in the tropical and subtropical zones. Different lesions of lungs in the buffalo are frequently observed in the abattoirs and diagnosed during the post mortem examination of carcass. Thus the present study was carried out to investigate the pathological lesions of lungs in the buffalo slaughtered in the slaughter house of Unnao and Barabanki district of Uttar Pradesh for human consumption.

Gross examination of lungs

A total number of one hundred eighty cases of buffalo slaughtered in the slaughter house of Unnao and Barabanki district of Uttar Pradesh was recorded during the months from October, 2022 to March, 2023. Among the slaughtered 180 cases observed, 90 cases each were from both the districts. In Unnao district total 34 cases (37.77%) of lung lesions were observed (Table 1) and 26 cases (28.88%) of lung lesions observed in Barabanki district (Table 1). The present finding of incidence of lung lesions in the slaughtered buffalo simulated with the earlier findings of Akbor *et al.* (2007) [1] in the dead Buffalos while he was studying the pathology of trachea and lung lesions of buffalo in Bangladesh.

Distribution of different lung lesions is presented in Table 2. The emphysematous lung (Fig. 1) was observed in 8 cases (8.88%) in Unnao district and in 6 cases (6.66%) in Barabanki district. Congestion with hemorrhagic lesions in lungs was in 14 cases (15.55%) and in 11 cases (12.22%) respectively in Unnao and Barabanki district. Three cases of (3.33%) of hard nodular growth/granulomatous lesions (Fig. 2) were found in Unnao district and one case of (1.11%) nodules lesions in the lung slaughtered in Barabanki was noticed. Pulmonary oedema was in 6 cases (6.66%) and 5 cases (5.55%) in Unnao and Barabanki district respectively. One case of fibrinous pneumonia (1.11%) and two cases of cyst in lungs was found in Unnao district and 2 cases (2.22%) of fibrinous pneumonia and one case cyst in lung were observed in Barabanki district (Fig. 3).

No cases of pulmonary abscess and any other neoplasm except 3 cases of nodular growth along with fibrosarcoma in lungs in Unnao and one case in Barabanki district was found, in the gross examination of lungs in the slaughtered buffalo in slaughter house of both the districts from the month of October 2022 to March 2023. Maximum cases of congested and hemorrhages in lung were observed followed by emphysematous conditions and pulmonary oedema in the slaughtered animal in both the districts during the study period.

The different pathological conditions of the lungs observed in the buffalo slaughtered in the slaughter house of Unnao and Barabanki districts were more or less similar with the findings of Akbor *et al.* (2007) [1], Singh *et al.* (2017) [12], Gunjan *et al.* (2022) [6], in the Cattle and Buffalo either during the post mortem examination or during the observation of slaughtered large animals in the slaughter houses.

Table 1: Number of cases with Lung lesions in slaughtered Buffalo in Unnao and Barabanki district

Month	District			
	Unnao		Barabanki	
	No. of slaughtered cases observed	No. of cases with Lung lesions observed	No. of slaughtered cases observed	No. of cases with Lung lesions observed
October, 2022	20	07	20	05
November, 2022	10	03	20	05
December, 2022	20	08	10	03
January, 2023	10	05	10	04
February, 2023	20	08	20	07
March, 2023	10	03	10	02
Total	90	34	90	26

Table 2: Distributions of different Lung lesions in slaughtered buffalo in Unnao and Barabanki district

Lung lesions	Number of cases in slaughtered buffalo	
	Unnao	Barabanki
Emphysematous lungs	08	06
Hemorrhage and congestion in lungs	14	11
Lung abscess	Nil	Nil
Hard nodular growth	03	01
Interstitial pneumonia	Nil	Nil
Pulmonary Oedema	06	05
Fibrinous pneumonia	01	02
Presence of cyst in lungs	02	01
Total	34	26

**Fig 1:** Emphysematous lungs along with congestion and haemorrhage**Fig 2:** Lung showed nodular growth**Fig 3:** Cystic lungs along with congestion

Microscopic pathology of pneumonic lesions

Microscopic sections of sixty pneumonic lungs were examined and the major histologic findings were as outlined. Histopathological examinations of 60 pneumonic lungs grossly classified as bronchopneumonia revealed exudates in the alveoli, bronchioles and bronchi; congestion of blood vessels hemorrhage and sometimes hyperplasia of associated bronchial lymphoid tissues. In the present study maximum cases of hemorrhage and congestion observed in slaughtered animal this might be due to seizures and struggling during slaughter (Islam *et al.*, 2014) [9]. Similar to present finding maximum cases of haemorrhage and congestion also observed by Islam *et al.* (2014) [9]. The cases of bronchopneumonia with gross pathology indicative of suppurative pneumonia had abundant neutrophils and few macrophages within the lumen of bronchi, bronchioles and alveoli. Vascular and bronchiolar congestion along with severe emphysema seen in some cases. Some cases lungs showed emphysema along with fibrosis and ruptured alveoli (Figure 4). In some cases severe emphysematous lung showed faint pink color fluid in the giant alveoli. Varying degree of goblet cell hyperplasia and proliferation of bronchiolar epithelium along with oedema of lamina propria were observed. At places there was degeneration and desquamation of bronchi epithelium. In few cases multifocal areas of necrosis of the lung parenchyma along with alveoli was seen. In some cases there was congestion of blood vessels along with necrosis and sloughing of bronchiolar epithelium. Cases of fibro sarcoma also observed during the study period along with hemorrhage in lungs.

Histopathological examination of lungs grossly classified as pulmonary emphysema revealed congestion of blood vessels, rupture of the alveoli with the formation of giant alveoli and remnant of alveolar wall of the adjacent alveoli. Some of the Emphysematous lung showed hyperplasia of the bronchial wall and peribronchial lymphoid tissue and exudates in the alveoli. One section from the emphysematous lung showed ruptured alveoli and peribronchial fibrosis. Histopathological findings of present study more or less simulated with the study of earlier workers (Haridy *et al.*, 2006) [8].

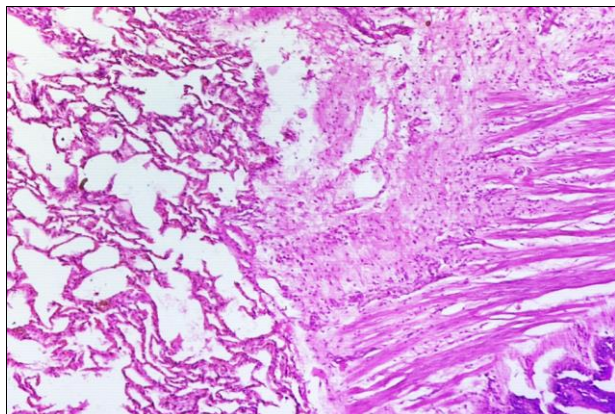


Fig 4: Emphysema of the lung showing rupture of the alveoli and fibrosis. H&E X100.

Conclusion

Pasteurellosis can occur in any season, according to the study's findings, however wintertime has the highest frequency because of external factors like the cold. It follows that there is a significant incidence of bovine pneumonia, with hemorrhage and congestion being the most common symptoms, followed by pulmonary oedema, which primarily affects the bilateral cranial lobes. The results of the investigation may prove advantageous in formulating therapeutic and preventive strategies to manage respiratory infections in buffalo. Although it is a potential cause of financial loss, pasteurellosis in cattle and buffalo is not the main focus of veterinary care in the slaughterhouses in the Unnao and Barabanki districts. The results validate the idea that it is higher in younger cattle than in buffalo because of a weakened immune system, and that it is higher in colder seasons because of crowded stressful housing conditions.

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