



RESEARCH ARTICLE

Clinical and Pathological Studies of Pneumonia in Sheep in Basrah

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ARTICLE INFO	ABSTRACT
Received: March 15, 2024 Accepted: May 20, 2024	<p>Study was conducted in Basrah from January till October 2023 depending on clinical cases of respiratory involvement attended to veterinary clinic. 30 animals were included in this study divided into two groups; infected group include 20 animals attended to veterinary clinic during the period of study and control group include 10 apparently healthy animal. All animals included in this study subjected to close clinical examination and vital signs were recorded in both infected and control groups. Clinical signs of infected animals were also recorded. Post mortem and histopathological examination were also done to dead animals. This study revealed that; there is significant increase in all vital signs in infected animals compared with control group. The clinical findings in infected animals include; nasal discharge (muroid) yellow-greenish in color thick in consistency, coughing with difficult breathing, painful cough with abnormal sounds, rapid and shallow breath, congested capillaries and extremely reddish mucous membrane, inappetence, dullness, sneezing with head shaking and extend toward down head, loss of weight, lacrimation unilateral or bilateral, recumbency then death occur within 5-7 days. The post mortem findings include: Enlarged lungs with black-bluish coloration as patches with rounded borders of the lung and multiple consolidation areas. Adhesion between the lungs and chest walls, yellow color fluid in the body cavities, and trachea was enlarged in diameter. The histopathological examination of dead animals reveals the signs of different type of bronchitis, pneumonia and liver congestion.</p>
<p>Keywords</p> Pasteulla Pasteurelosis Penumonitis	
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INTRODUCTION

Pneumonia is a diseases of multifactorial causes including infectious and noninfectious agents (Di Pavavid et al., 2017 and Khareeb et al., 2022). Infectious pneumonia is the inflammation of lung tissue caused by several infectious agents such as bacteria, viruses, parasites and mycotic causes (Jiang et al. and Zhu et al., 2021). Pneumonic pasteurellosis is the most common type of pneumonia with high prevalence in ruminants especially in sheep (Dar et al.2012 and Tizard, 1992). Pneumonic pasteurellosis is the oldest type of pneumonia of domestic animals and still remain the major problem (Dhand, 2004). The clinical pictures of pneumonia ranged from mild to severe respiratory distress and sudden death which related to virulence of strain, host immunity state, and concurrent diseases (Daee,et al.,2020 and Dassanayake et al.,2010). The main clinical signs of pneumonic pasteurellosis include fever, yellow-greenish muroid nasal discharge, coughing, dyspnea with painful coughing, congestion of mucous membrane, sneezing, loss of weight, bilateral or unilateral lacrimation and lateral recumbency and death during 72 hours (Walsh et al., 2016 and Finkbeiner et al.,2009). The main post mortem lesions include Enlarged lungs with black- bluish coloration as

patches with rounded borders of the lung and multiple consolidation areas. Sometimes recording of adhesive between the lungs and chest walls (Amaravathi, 2014).

MATERIALS AND METHODS

Twenty animals suffering from respiratory symptoms attend to our veterinary medicine clinic subjected to complete close clinical examination for clinical and vital signs to contrast with ten apparently healthy animals considered as a control group. Vital and clinical signs were recorded in both infected and control groups. Post mortem examination was done for 3 dead animals. Lung tissue samples about 1 cubic centimeter were directly taken from different lesions by sterile scalpel and fixed with 10% of formalin for histopathological examination. The samples were dehydrated in graded ethanol, cleared by xylene, embedded in paraffin as blocks and sectioning from blocks were cut at 4-5 Mm using rotary microtome, finally the samples stained with hematoxylin and eosin stains (Bancroft et al. 1996). The PCR confirmative diagnostic study will publishing in another article.

RESULTS

The clinical manifestation of examined animals includes: Fever (20 cases), there is significant elevated in body temperature and respiratory and pulse rates in disease animals compared with control group (Table: 1). The other clinical findings include: nasal discharge (mucoid) yellow-greenish in color thick in consistency (16 cases), coughing with difficult breath in (15 cases), painful cough with abnormal sounds (12 cases), rapid and shallow breath (16 cases), congested capillaries and extremely reddish mucous membrane (10 cases), inappetence (20 cases), dullness (17 cases), sneezing with head shaking and extend toward down head (14 cases), loss of weight (8 cases), lacrimation unilateral or bilateral (6 cases), recumbency then death occur within 5-7 days (3 cases).

The post mortem findings are: Enlarged lungs with black- bluish coloration as patches with rounded borders of the lung and multiple consolidation areas. Adhesion between the lungs and chest walls, yellow color fluid in the body cavities, and trachea was enlarged in diameter.

Table 1 (1): The vital signs in infected and control animals

	H.R	Pulse	Res.
Infected	41.7±0.26	120.7±11.86	98.9±10
Control	39.2±0.2	80.2±7.7	61.33±8.66
P value	P≤ 0.05	P≤ 0.05	P≤ 0.05

The results of histopathological examination of the sheep lung infected with pasteurellosis reveal many different changes include hyperplasia of bronchioles with diffuse area of haemorrhage, excessive area of fibrosis also to collection of inflammatory cells. As in figures (1 and 2).

The pleura was thickening by fibrin layer with present necrotic lesions and noted suppurative bronchopneumonia, (extensive area of necrosis of alveolar space and filled with pus) as in (figure 3). Other changes comprise a picture of focal area of necrosis of alveoli and filled with exudate, Also haemorrhages with inflammatory cells infiltration that represented in (figure 4). While the histopathological examination of liver section from infected animal with pasteurella illustrate congestion of central vein, dilation of sinusoid also to present vacuolation of hepatocyte and area of coagulative necrosis as in figures (6 and 7) and present of fibrosis, haemorrhage area (figure 7 and 8).

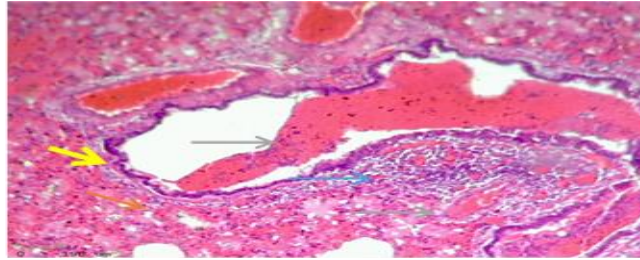


Figure 1. Histopathological section of sheep lung infected with pasteurella, shows hyperplasia of bronchioles (→), with defuse area of haemorrhage (→), excessive area of fibrosis (→) also to collection of inflammatory cells (→). (H&E X40).

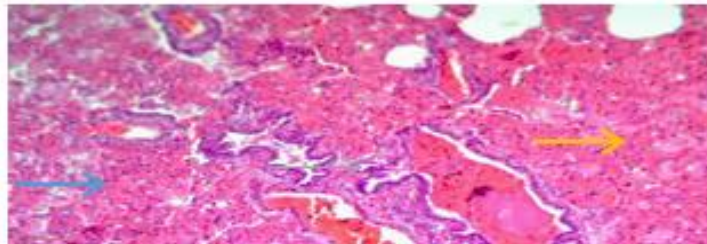


Figure 2. Histopathological section of sheep lung infected with pasteurella, shows hyperplasia of bronchioles and filled with blood, (→), alveolar space filled with exudative fluid (→), excessive area of fibrosis also to collection of inflammatory

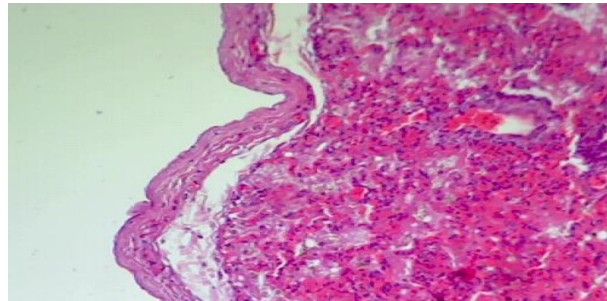


Figure 3 . Histopathological section of sheep lung infected with pasteurella, shows The pleura was thickening by fibrin layer (→) with present sever necrotic alveoli and filled with exudate (→) haemorrhages with collection inflammatory cells(→) (H&E X10).

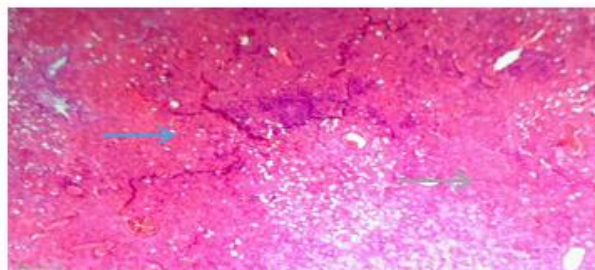


Figure 4. Histopathological section of sheep lung infected with pasteurella, explain focal area of necrosis of alveoli with inflammetocytes (→) excessive exudate filled alveolar space (→). (H&E X40).

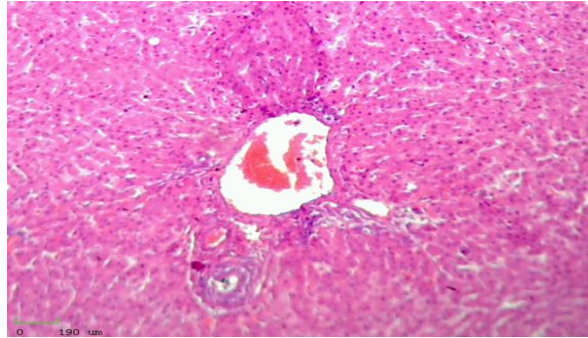


Figure 5. Histopathological section of sheep liver infected with pasteurella, shows congestion of central vein (→), dilation of sinusoid also to present.

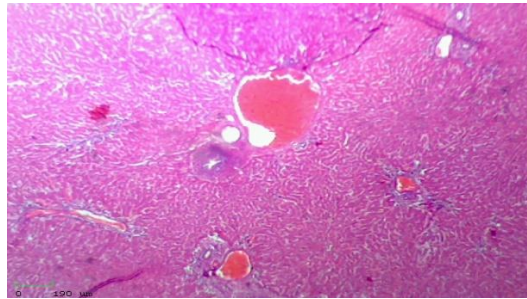


Figure 6 . Histopathological section of sheep liver infected with pasteurella, shows congestion of central vein(→), hyperplasia of bile ducts(→), focal area of coagulative necrosis of hepatocytes.(→)H&E X10).

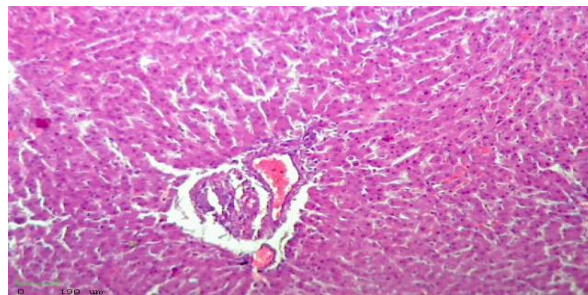


Figure 7 . Histopathological section of sheep liver infected with pasteurella, Shows dilation of sinusoid (→), congestion of blood vessels surround by inflammatory cells.(→), and defuse area of necrotic hepatocyte with present haemorrhage (→).(H&E X10).

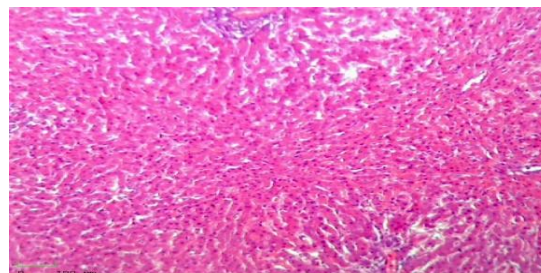


Figure 8. Histopathological section of sheep liver infected with pasteurella, Shows coagulative necrosis of hepatocytes (→), with aggregation of inflammatory cells (→), and fibrosis (→).(H&E X10).

DISCUSSION

The clinical findings recorded in this study was in agreement with (Tolera et al 2019), who reported depression, with a mucopurulent nasal and ocular (eyes) discharge, exhibit inappetence, weight loss and temperatures rise to 40.4°C to 42°C. This signs may occur do to the bacteremia and immune system reaction. Most cases happen within two weeks after transportation and the development of disease can be rapid with death without showing clinical signs of disease (Tolera et al 2019). The early clinical signs are anorexia, high fever, and frothing, coughing and rapid shallow (respiration) breathing accompanied by more profuse mucopurulent nasal and ocular or eyes discharges. In the later stage of infection severe cough predominates where dyspnea with an exhalation grunt (Cozens et al 2019). The results of postmortem examination were in disagreement with (Aiswarya et al 2017) who report the fibrino-purulent bronchopneumonia without the multifocal coagulation hemolytic necrosis, *M. haemolytica* were also characteristics of fibrinous lobar pneumonia. The differences in the post mortem lesions may be due to the differences of strain involved in disease. The results of histopathological examination of the sheep lung infected with pasteurellosis reveal many different changes include hyperplasia of bronchioles with defuse area of haemorrhage, excessive area of fibrosis also to collection of inflammatory cells; these results were in partial agreement with (Hashemnia and Chalechale 2019) who found hyperemia in 7.11% and characterized microscopically by the presence of of large number of red blood corpuscles and siderocytes out of the blood vessels. The gross and histopathological findings were typical of fibrinous pneumonia and in agreement with (Odugbo et al 2006). The bronchitis and bronchiolitis of the infected animals in this study were in partial agreement with (Singh et al 2017) who found bronchiolitis in 2.22% of cases in sheep and goats.

REFERENCES

1. Di Pavavido A, Averaimo D, Zilli K, Marruchella G, Scacchia M (2017). Mycoplasma pneumonia in small ruminant; A ten years long retrospective survey. *Small Rumin. Res.*153: 103 – 106.
2. Khareeb W K, Ibrahim I Z, Abdulla A F (2022) . Pathological and molecular detection of Mycoplasma ovipneumonia in sheep , Basrah Province, Iraq. *Archives of Razi Institute* , 77, 6; 2073 – 2080.
3. Jiang Z, Song F, Li Y, Xue D, Deng G, Li M (2017) . Capsular polysaccharide is a main component of Mycoplasma ovipneumonia in the pathogene induced Toll- Like receptor mediated inflamatory responses in sheep airway epithelial cells . *Mediators Inflamm.* , : 989 – 1673.
4. Zhu M , Cao S, Zheng W, Zhai M , Wang M, Blair H T (2021) . miR 509-5p anti infection response for Mycoplasma pneumonia in sheep by targeting NF-kappaB pathway . *Vet Immunol. Immunopathol*, 238: 110275.
5. Dar L M , Darzi M M , Mir M S, Rashid A, Syed S A (2012). Prevelance and pathological studies on ovine pneumonic pasteurellosis in Kashmir valley ,India . *Eurasian J.Vet.Sci.*28, 4,: 199 – 203
6. Tizard I (1992) . Veterinary immunology : An Introduction . W. B. Saunders Co. Philadelphia ; USA: pp 278 – 279.
7. Dhand N K, Singh J, Gumber S, Banger H S (2004). An outbreak of pasteurellosis in small ruminants in Punjab. *J. Res.Punjab Agri.Uni*, 41: 147 – 149.
8. Daee A A, Khodakaram-Tafi A, Derakhshandeh A, Seyedin M (2020). Identification of Mycoplasma ovipneumonia and Mycoplasma arginine in sheep with pneumonia in North East of Iran . *J. Vet. Res.*, 21(1) : 15 – 19.
9. Dassanayake R P, Shanthalingam S, Herndon C N , Subramaniam R, Lawrence P K , Bavananthasivam J (2010). Mycoplasma ovipneumonia can predispose bighorn sheep to fatal Mannheimia haemolytica pneumonia . *Vet. Microbiol.*, 145 (3) : 354 – 359.

10. Walsh D P, Cassirer E F, Bonds M D, Brown D R , Edwards W H, Weiser G C (2016). Concordance in diagnostic testing for respiratory pathogens of bighorn sheep. *Wildl. Soc. Bull.*, 40 (4): 634 – 642.
11. Finkbeiner W, Ursell P, Davis R (2009). *Autopsy pathology: Manual and atlas: Saunders an imprint of Elsevier Inc.*
12. Amaravathi M (2014). Pathomorphological studies on spontaneous lung lesions in slaughtered sheep. *MSc thesis of veterinary science, Sri Venkateswara veterinary University Tirupati India.*
13. Bancroft D J, Cook C H , Striling R W , Turner D R (1996). *Manual of histological technique and their diagnostic application. Churchill Livingstone, New York.*
14. Tolera T, Wirtu A, Kumsa B, Zerabruk E, Albene Y, Tadesse F et al. (2019). Identification of serotypes *Pasteurella multocida* and *Mannheimia haemolytica* from cattle and sheep in central Ethiopia; 1-17.
15. Cozens D, Sutherland E, Lauder M, Taylor G, Berry CC, Davies RL (2019). Pathogenic *Mannheimia haemolytica* invades differentiated bovine airway epithelial cells. *Infect Immun.* 87: 13-5.
16. Aiswarya V, Mathakiya RA, Bhanderi BB, Roy A (2017). Characterization of *Pasteurella multocida* isolates of buffalo origin from Gujarat state of India by outer membrane protein profile analysis. *Buffalo Bull.* 36: 313-22.
17. Hashemnia M, Chalechale A,d: gross and histopathological findings . Malmir, E (2019). Pulmonary lesions in slaughtered sheep in Western Iran. *Veterinary Italiana.* 55: 47 – 56.
18. Odugbo M O, Odama L E, Umoh J U, Lamorde A G (2006). *Pasteurella multocida* infection in sheep; prevalence, clinical and pathological studies. *Small Rum. Res.*, 66: 237 – 277.
19. Singh R, Kumar P, Sahoo M , Bind R B, Asok Kumar M , Das T, Kumari S, Kasyab G ,Yadav J P, Saminatham M , Singh K P, Singh R (2017) . Spontaneously occurring lung lesions in sheep and goats. *Indian Journal of veterinary pathology*, 41: 18 – 24.