

A STUDY OF SOME PATHOLOGICAL LESIONS IN THE LUNG OF SHEEP AND DUHOK ABATTOIR

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ABSTRACT

An abattoir study was conducted on 21854 sheep, and 3659 goats are slaughtered in Duhok abattoir, from October 2013 to January 2014. The objective was to determine the prevalence of disease conditions affecting the lungs. Routine meat inspection procedures were done to detect the presence of the pathological lesions. A total of 21854 (13%) and 3659 (4.3%) lungs of sheep and goat, respectively, were examined and the main condemned diseases in this study were recorded as namely pneumonia, and hydatidosis. From this study the pathological features was concluded that 4 main forms of different types of pneumonia and hydatid cyst which recorded according to macroscopical and histological features.

INTRODUCTION

Respiratory diseases are common in all species of domestic animals, and they are appear due to the interaction of many of infectious agents like (bacteria, mycoplasma, viruses, fungi, parasite, host defense and environmental factors which are causes high mortality rate and economic losses associated with respiratory diseases of sheep and goats (1, 2, 4).

The main respiratory disease is occur due to inflammation of the lung tissues called pneumonia which is widespread among sheep and goat all over the world and it is considered to be one of the most important causes of losses in the small ruminant

industry (9, 11). The other important respiratory disease caused mainly by parasitic infections called *Echinococcus granulosus* which caused by the larval stages of these (Echinococcosis/hydatidosis) (tapeworm) species have been recognized as the most important helminthes and zoonotic diseases, with great economic and public health significances is developed in many countries (12,13, 14, 15).

Sheep and goats are regarded as the most principal slaughtered animals for human consumption in Duhok province and due to a differentiation of the geographic location, nutrition and climate are determining factors on the type of microorganism causing pneumonia. In addition, rearing systems, stress factors, climatic changes, unhygienic conditions, sudden changes in feed and a low level of herd health status are stated as predisposing factors to bacteria, parasites and viruses infection which are recorded the one common cause of lung lesions and death of infected animals, therefore, the aims of this work are to know some epidemiological factors and determine the common pathological lesions of pulmonary tissues in sheep and goats at Duhok abattoir in Kurdistan region of Iraq.

MATERIALS AND METHODS

Data collection

In this study, data collected from 25513 sheep and goats were slaughtered at Duhok abattoir during four months of the study was extended from October 2013 to January 2014. All pulmonary tissues are inspected the presence of different pneumonic lesions using case history , gross macroscopically inspection and recorded of the results. Twenty pulmonary tissue samples were suspected to any pathgnomic lesions with 5 normal once were subjected to histopathological technique at Duhok Research Center, Faculty of Veterinary Medicine- University of Duhok.

Histopathological study

Pulmonary tissue samples about 1 cm³ in thickness were directly taken from different lesions using a sterile scalpel and were fixed with 10% of neutral-buffered formalin for histopathological examination. The samples were then dehydrated in graded ethanol, clearance with xylen, embedded in paraffin as blocks and sectioning from blocks were cut at 4-5 µm in thickness using rotary microtome (Leica, Germany). Finally, the samples

were stained with Haematoxylin and Eosin stains (3) for examination using ordinary light microscope to taken the photography (Lecia, Germany)

RESULTS

On the basis of gross macroscopic inspection survey, the inflammatory lesions were found 856 (3.8 %) samples in sheep and 115 (3.1) samples in goats. In addition, hydatid cysts were appeared in 1998 (3.9 %) and 43 (1 %) samples in sheep and goats respectively (Table: 1).

Table 1: The number of slaughtered animals in abattoir with lung lesions

Species	Examined animals	Pulmonary inflammatory lesions	Infected with hydatid cyst
Sheep	21854	856 (3.9%)	1998 (9.1%)
Goats	3659	115 (3.9%)	43 (1.1%)
Total	25513	971 (3.9%)	2041(7.9%)

Pulmonary lesions and hydatid cyst were appeared in most of the different seasons with varying degrees, but at November showed the presence of the pulmonary lesions as high rates 5.5 %. Hydatid cysts gave highest rate 11 % at December during the present study. Generally, the results of prevalence of the respiratory diseases showed in sheep are more common than goats between October to January . The results of the study according to months and species of animals were seen in Table (2).

Table 2: The number of slaughtered animals in abattoir with lung lesions by months

Animal species	Months of study	Examined animals	Pulmonary inflammatory lesions	Infected with hydatid cyst
Sheep	October	7451	200 (2.6%)	556 (7.4%)
	November	4539	216 (4.7%)	368 (8.1%)
	December	4972	208 (4.1%)	548 (11%)
	January	4892	232 (4.7%)	526 (10%)
Total		21854	856 (3.9%)	1998 (9.1%)
Goats	October	1224	34 (2.7%)	13 (1%)
	November	806	45 (5.5%)	12 (1.4%)
	December	878	23 (2.6%)	14 (1.5%)
	January	751	13 (1.7%)	4 (0.5%)
Total		3659	115 (3.1%)	43 (1.1%)

Pathological observation of lung lesions of sheep and goat

In the current study, a total of 20 samples of pulmonary tissues were found 18 samples affected with pathological lesions. According to macroscopic appearance (texture, exudation, distribution and sites of lesions) and microscopic findings of lesions, the samples were classified to different types of pneumonia, hydatid cyst and nodular reaction. The pathological observation of the lung lesions included:

Suppurative bronchopneumonia

The results showed 20 % (4 / 20) of samples were diagnosed as suppurative bronchopneumonia according to gross and histological features. The gross appearance of the lung showed irregular shape of affected parts and consolidation varied from dark red to grey-pink (Figure: 1). The gross appearance of the affected area of the lung appeared moist and purulent exudates leaked from bronchi and some abscessation of foci scattered throughout the affected part. Microscopically, alveolar spaces and lumens of the air ways are filled with inflammatory exudates and inflammatory cells mostly neutrophils, debris, fibrin deposition, and severe congestion were observed in these areas. Due to complete

or partial obstruction of the airways some of the lobules showed atelectasis and/or emphysema (Figure: 2, 3 and 4).



Figure 1: Gross appearance of lung showed moist and purulent discharge leaked from bronchi

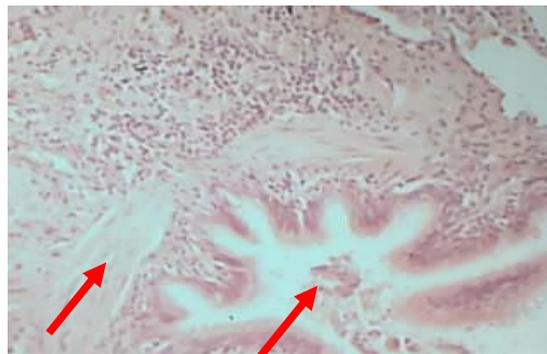


Figure 2 Alveolar spaces and lumen of the bronchi are filled with inflammatory exudates and inflammatory cells mostly neutrophils, debris, fibrin, were observed in these areas .arrow.10x H&E

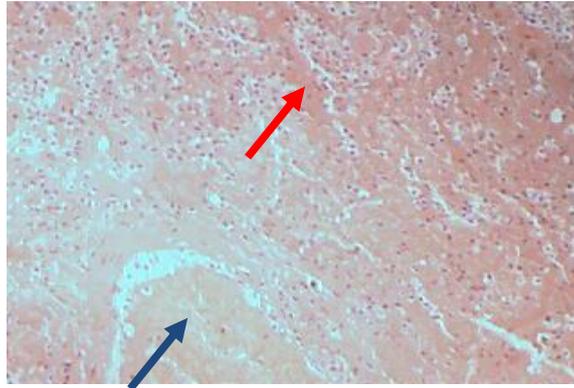


Figure 3 Alveolar spaces are filled with purulent exudates, inflammatory cells and some abscessation of foci scattered throughout the affected part with severe congestion.10xH&E

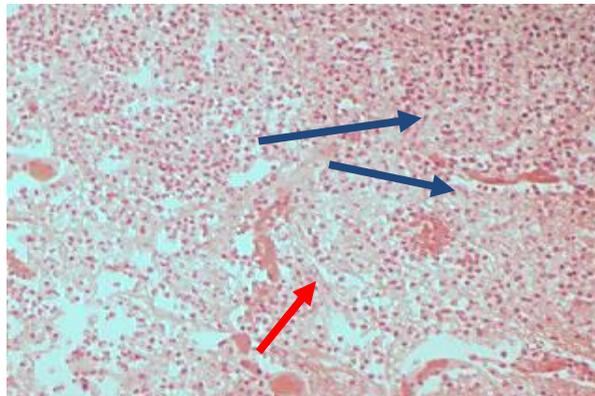


Figure 4 Alveolar spaces filled with inflammatory exudates and inflammatory cells with congestion 10x H&E



Figure 5: lung surface showing irregular shape whitish to yellowish color of fibrin as a layer covered the lung surface

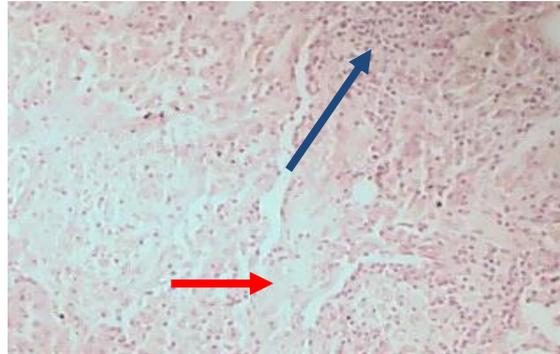


Figure 6 alveolar spaces showing presence of multifocal areas of necrosis and variable amounts of fibrinous exudates with sever infiltration of acute inflammatory cells. 10x H&E

Fibrinous bronchopneumonia

Fibrinous bronchopneumonia was detected in 15 % (3/20) of the examined lungs samples. Macroscopically, lesions appeared irregular shape and color changed of some fibrin sheath which covered the surface of the lung and sometimes inside of the bronchi (Figure 5). Microscopically, the affected lungs were characterized by diffuse capillary congestion, presence of multifocal areas of necrosis, variable amounts of fibrinous exudates also present in the lumen of the alveoli and bronchioles with thickening of the interlobular septa and pleura due to inflammatory exudates, inflammatory cells and edema. (Figure 6, 10)

Granulomatous pneumonia

Granulomatous pneumonia was detected in 10 % (2/20) of the examined lungs specimens of sheep and goat. Macroscopically, appeared as hard multifocal nodules of different size distributed throughout the lung surface. These foci characterized by white color, the size around 1-6 cm in diameter, which is surrounded by a clear discrete, red and hemorrhagic area (Figure 8). Microscopically, these nodules showed central necrotic area appeared as a cheesy material and surrounded by a zone of layers which consist of the different inflammatory cells with zone of the fibrous connective tissue (Figure 9, 10)

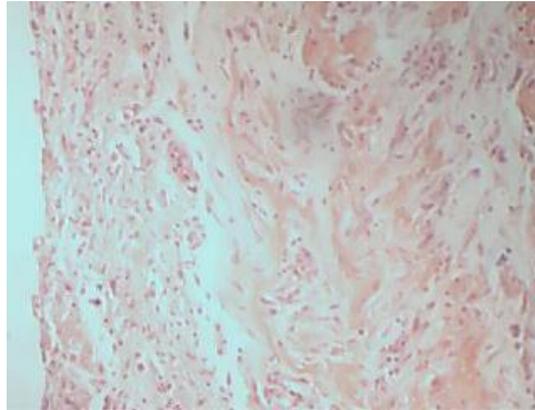


Figure 7 Microscopical changes of lung due to fibrinous-bronchpnumonia showing thickening of the interlobular septa and pleura due to inflammatory exudates, inflammatory cells and edema 10x H&E

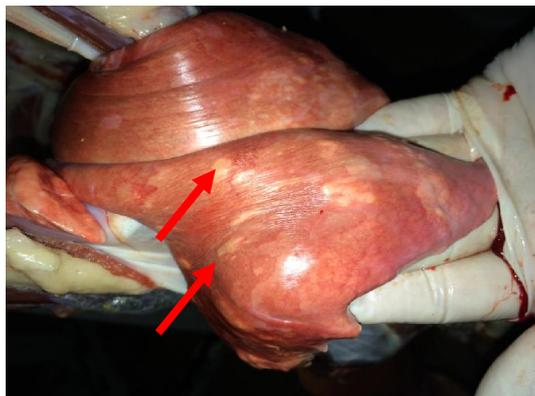


Figure 8: lung showing hard multifocal nodules with different size distributed throughout the lung surface

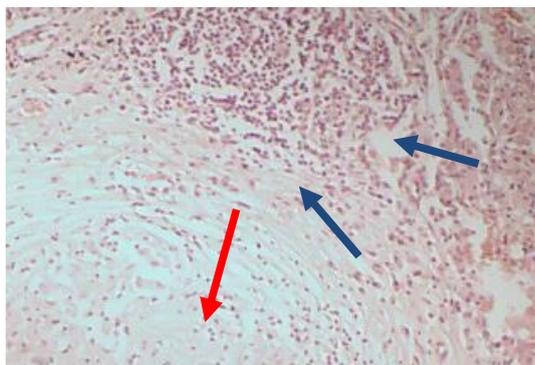


Figure 9 central caseous necrotic area appears as Gessy and surrounded by a zone of layers consist of different inflammatory cells and fibrous connective tissue .10x H&E

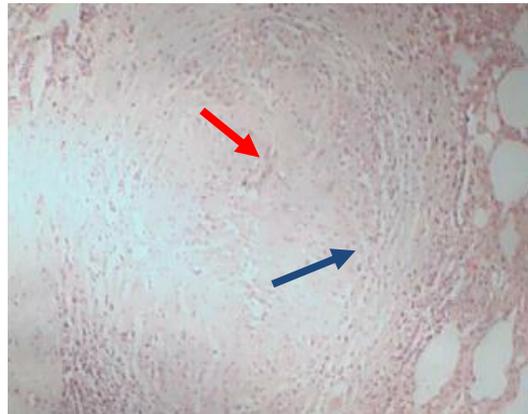


Figure 10 Granulomatous reaction consist of central area of caseous necrosis surrounded by a zone of layers consist of different inflammatory cells and fibrous connective tissue .10x H&E

Parasitic pneumonia (Hydatid cyst)

A total of 20 lungs samples examined were found 9 samples positive for hydatid cyst with varying degrees in size which appeared in outer and parenchyma of the lungs (Figure, 11). Microscopically, the effected lung tissues near to cyst showed sever infiltration of mononuclear inflammatory cells, bronchitis and peribronchial reaction as well as bronchiactasis (Figure 12 and 13). While the wall of the cysts has 3 structural components an outer cellular laminated membrane, the germinal membrane and the protoscolices (Figure, 14).

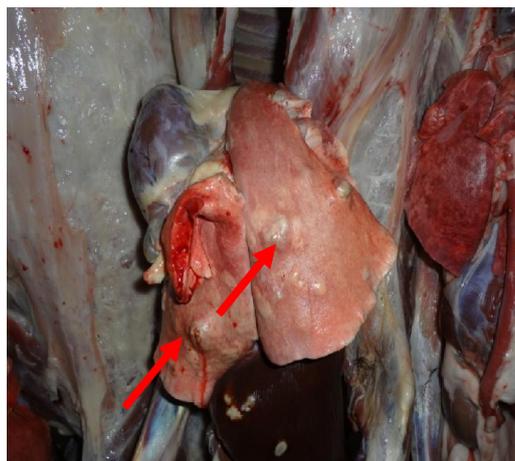


Figure 11: lung showing varying degree of hydatid cyst appear in outer and paranchymea of lung

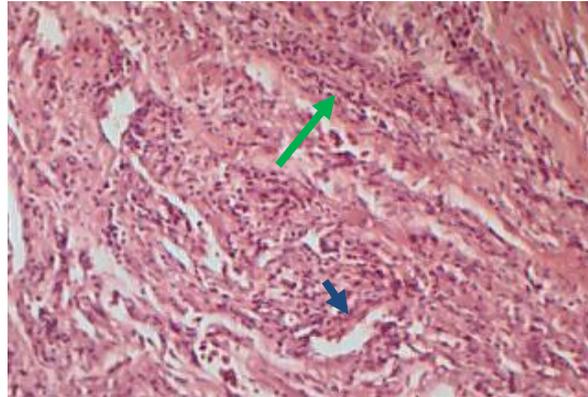


Figure 12 Histological examination of lung showing a thick layer of granulated tissue and fibrous tissue, the cyst cavity and parasitic material and interstitial lymphocytic infiltration 10x H&E



Figure 13 Histological examination of lung showing bronchiolectasis, chronic bronchiolitis, edema and perbronchial inflammatory reaction 10x.H&E

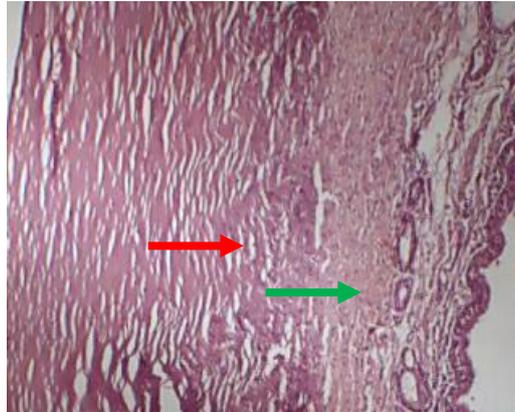


Figure 14 Histopathological examination of lung showing layers of cyst outer layer of cyst which compressed to alveolar which is cellular laminated, the germinal membrane and the protoscolices 10x H&E

DISCUSSION

Respiratory diseases are common in various species of domestic animals particularly in sheep and goats causes very significant economic losses including lost trade on the sheep industry, high mortality rate as well as costed of diagnosis and treatment (6). The evaluated of prevalence, onset of lung lesions, their impact on growth of animals species which showed that severe lung lesions could lead to greatly decreased growth performance of the animals (7). Different types of pneumonia were observed in this study using macroscopical and histopathological examination of the lung samples which chose during this study, including suppurative bronchopneumonia, fibrinous bronchopneumonia and granulomatous pneumonia as well as hydatid cyst and this variation in the prevalence rates of different types of pneumonia in small ruminants in different study also may attributed to the factors variation such as nutritional status, breed, nature of country and environmental conditions. In addition of the effect of stressors including transportation and overcrowding, all these factors could possibly play a constructive role in predisposing factors for the development of different types of pneumonia (5, 8 and 10). Results also revealed that the highest percentage of hydatid cyst was recorded in sheep (11%) in December, while the highest percentage of pulmonary lesions was observed in goats (5.5 %) at November. This may explained by the differences of countries geography, time of study conducted or a result of cool weather, unrestricted, and careless

for management and importation of animals from different parts of the world to our country. The widespread geographical distribution of hydatid cyst disease in this study with many of researcher might be attributed to the worldwide availability of susceptible hosts, and the increasing of environmental pollution (14, 15). In our country, the number of the stray dogs are high and usually contact with other animals especially sheep and goats without any restrict in which plays as important role in the transmission of the hydatid cyst (*Echinococcus spp.*) because infected dogs are able to excrete a great number of segmented full of eggs with their feces contaminating the soil and spreading the infection (16). In conclusion, a number of inflammatory diseases of the lung and hydatid cyst disease according to this study changes in affected areas indicated the types, extent of pathological change occurred, the agent involved and responsible for the development of different diseases of the lung.

دراسة الآفات المرضية الرئوية في الأغنام والمعز في مجزرة دهوك

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أخلاصة

اجريت الدراسة في مجزرة دهوك على ذبائح الاغنام والمعز السليمة ظاهريا بواقع ٢١٨٥٤ و ٣٦٥٩ ذبيحة على التوالي للفترة من تشرين الأول ٢٠١٣ لغاية كانون الثاني ٢٠١٤ بهدف تحديد مدى انتشار الامراض التي تؤثر على الرئتين وافاتها بالطرق الروتينية. أظهرت النتائج ان نسبة الاصابة الكلية للأفات الرئوية بلغت ٣% و ٤.٣% في كل من الاغنام والمعز على التوالي. وطبقا للفحوصات العيانية والنسجية ظهرت اربعة انواع رئيسية من الالتهابات الرئوية (ذات الرئة)، فضلا عن وجود العديد من الحالات المصابة بالأكياس العدرية.

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