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Histopathological study on some form of bovine pneumonia

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Abstract

A total of 1234 cow lungs were examined grossly from apparently healthy adults cows slaughtered at Basra during the period from January 2005 to June 2005.

Tissue from pneumonia lungs were collected processed sectioned at5- 6µ and stained for histopathological study conducted on 127 consolidated lungs of adult cows.

Pneumonia has been classified according to the type of inflammatory and pulmonary reaction as well as the lesion duration. Pneumonia in the descending order of prevalence were chronic interstitial pneumonia, fibrinous pneumonia, fibrinopurulent pneumonia, acute suppurative pneumonia, lymphoid pneumonia and chronic pneumonia .

The prevalence of pneumonia in adult cows on the basis of histopathological examination in this study was 9.5%, the role of the such lesion in cows were discussed.

Introduction

Cows are the most important milk production and meat producing domestic animals in Iraq .and play important role in the rural economic of various countries. Pneumonia is known to occur as either a primary or secondary condition, or some earlier workers [7] regarded pneumonia has always been problem for the livestock owner and veterinarian because of the unsatisfactory knowledge of its cause ,modes of dissemination and treatment .

In a previous report ,studied on pathology of pneumonia and associated pulmonary lesion discussed of cattle and buffaloes [9,11].while others studied the etiology and pathology of pneumonia in cows as well as pneumonia in the most frequent respiratory infectious [18,16],moreover, other worker considered one its etiology the virus complicated with bacteria were the most frequent causative agents[1,24]٩

This study was an attempt to find out some form of pneumonia in cows slaughtered for meat production in the abattoir of Basra ,pathological lesion were detected in the lungs of 127 slaughtered cows ,they were subjected to histopathological examination .

Materials and methods

Pneumonia lungs from 127 adults cows with gross lesions were collected from Basra abattoir through the examination of 1324 lungs, portions of gross lung lesions were collected in 10%neutral phosphate-buffered formalin solution for histopathologic examination after fixation , tissues were processed routinely for paraffin embedding and 5-6µ sections were stained with hematoxylin and eosin (H&E),and others special stains whenever required .

The histopathological sections mode and examined according to manual of histopathological of special technique by [13, 22]..

Results

The recorded pathological conditions in this study are mentioned in the (table1.)out of 1234 pairs of cow lungs were examined ,127(9,54%)were founded to be positive for pneumonia . the gross and histopathologcal changes of pneumonia in the consolidated lungs of the cows were ; suppurative pneumonia 45 cows, non-suppurative pneumonia 32 cases, are the remain 50 cases were showing chronic changes. the 45 cases of suppurative pneumonia include ;21 of them were fibrinopurulent pneumonia ,12 cows acute suppurative pneumonia, 7 cases acute bronchopneumonia and 5 cases aspiration pneumonia, while in 32 cases of non-suppurative pneumonia;24 cases fibrinous pneumonia , 5 cases lymphoid pneumoia and 3 cases were acute hemorrhagic pneumonia , and eventually the last types of pneumonia included ; 31cases chronic interstitial pneumonia , 10 cases chronic granulomatous pneumonia ,6 cases chronic pneumonia and chronic bronchopneumonia was observed in 3 cases only . all cases were classified depend on the type of exudates and its exist , type of lung response as well as the lesion duration .

The gross and microscopic lesion of most types of pneumonia in this study confirmed the typical pattern, as recorded in standard text books.

In chronic granulomatous pneumonia , 2 cases were actinomycotic type pneumonia; the center of lesion is contain caseous necrotic mass with mixed necrotic debri and rosette shape

eosinophilia type bacterial colony by using brown & brenn stain ,with variable size embedded in degeneration neutrophilic cellular infiltration surrounded by focal extensive and tremendous reticulo-endothelial granulation tissue with infiltration of macrophages, lymphocyte (fig,1).

Acute and bronchopneumonia ,these were recorded in 7(5,51%)and 3(2,36%) respectively .they were showeded suppurative exudates along with neutrophilic aggregation in bronchi as well as alveoli , in some cases ,mononuclear cells (lymphocytes , macrophages)were showed mixed with neutrophile (fig,2). Such lesion could indicate bacterial infection.

Acute suppurative pneumonia was observed in 12(9,45%);the lesion involve both lungs ,it is showed suppurative areas surrounded by congestion and consolidation , emphysema was also present . in two cases ,microscopic picture was typical of suppurative inflammation , some alveoli showed had large number of streaming macrophages or packed with oat-shaped macrophages as bundle among alveoli(fig,3)

Chronic interstitial pneumonia : under this study ,31(24,41%)cases of pneumonia were observed ,grossly these was fibrosis mostly in the diaphragmatic lobes ,in majority of the cases the lesions were confined to the antero-ventral lobes of the lungs . this lungs showed atelectatic and emphysematous lobules and others lobes were pale, hyperemic and red. microscopically , there was an increase in the thickening of the intralobular and interlobular space and proliferation of the mononuclear cells chiefly lymphocytes and macrophages (fig.4) . fibroblastic proliferation in the interstitial tissue was also present ,in some cases in a milder form, in general air ways normal except a few bronchi showed desquamation of epithelial layers and contained catarrhal exudates in the lumen ,alveoli had collapsed and compensatory emphysema was a common feature in almost all the cases.

Lymphoid pneumonia were recorded in 5(3,94%) cases of pneumonia , grossly the affected lobes were showed red and smaller in volume and almost confined to atypical and cardiac lobes.histopathologically changes were extended peribronchiolly ,bronchial degeneration , infiltration of mononuclear cells in bronchial submucosa , the alveolar septae were thickened due to dilation of lymphatic vessels, infiltration of mononuclear cells and congestion ,however, lymphoid producing progressive collapse of the lumen and the surrounding alveoli and hence bronchial, alveolar lumen appeared much diminished and obliterated.

Acute hemorrhagic pneumonia :this was observed in 3(2,36%)cases ,in all cases the apical and cardiac lobes were particularly involved .the selected lung pieces on cutting appeared consolidated and reddish in co lour. microscopically appeared widespread hemorrhage were the main feature of the all these cases ,sharply demarcated bright red blood cells were observed completely filling the spaces wherever hemorrhages was observed ,and it involved the lung alveoli as well as bronchi and bronchials, also slight infiltration of mononuclear cells also in the parenchyma .

In chronic pneumonia ;only 6(4,72%)cases were recorded in this study ,the colour varied from grayish pink to red in appearance , the lung did not collapsed and were hard to cut and depressed at places, in on cases ecchymotic areas was noticed

.microscopically, the main features were replacement lung parenchyma by fibrous tissue, the alveolar septae were thickening due to mononuclear infiltration mostly lymphocytes and severely congested blood vessels ,bronchi also affected ,in these affected bronchi the epithelium was desquamated and lumen filled with degenerated cellular mass. The infiltrating cells were also observed in the submucosa of bronchi.

Discussion

There was a considerable variation in the microscopic pathology in numbers of the cases studied .the higher prevalence of the chronic changes suggested the possibility of subclinical infection in these bovine .the gross and microscopic changes in these types of pneumonia were similar to these described by others [15].during this study we recorded 127 out of 1234 bovine lungs were examined with 11 various types of pneumonia including ;chronic granulomatous pneumonia ,bronchopneumonia,fibrinopurulent pneumonia which have already been reported by[1,17].the incidence rate of pathological condition constituted 9,59%,the same percent recorded 10% [4].the lungs of 127 bovine slaughtered at abattoir revealed 22 acute,53 chronic type of pneumonic changes. however , found 17 acute ,13 subacute and chronic bronchopneumonia in 31 pairs of lungs collected from 9bovine ,12ovine and 11porcine lung [16].the non-suppurative and suppurative pneumonia observed in this study was corresponding to the catarrhal and purulent form,and the acute form of bronchopneumonia as well as suppurative type was described by [7,23,24]

Aspiration pneumonia does not figure to the most of the reports perhaps it was dealt under purulent or acute necrotizing pneumonia .but keep in view the classification of pneumonia based on etiology, as well as it is variable reaction from purulent to abscessation and gangrenous type , it has be dealt as aspirate entity.

The incidence rate of chronic interstitial pneumonia which represented approximately 24,4%of the cases studded , these finding were in accordance with earlier reports [3,14,18]. Interstitial reaction is predominantly reaction to the viral, mycoplasma, Chlamydia and some forms of bronchial infection [21], while considered allergic reaction in addition to inhalation of nitrogen dioxide gas and chemical agents as the cause have been supported by [15, 18 , 22].

Lymphoid pneumonia constituted 3,94%,this incidence rate were different from that recorded by [6],but nearly the same percent described by [14].these observation have strengthened the view that the virus is a probable etiological agent ,however , the possibility of other microbial agents playing same or the other role.

Twelve cases of acute suppurative pneumonia were recorded and constitute 9,44%,in two cases that already were packed oat-shape macrophages ,such lesion have been reported to be caused by pasturella [17],these finding also reported in ovine [2,12].

Ten cases of chronic granulomatous pneumonia were recorded in present study which constituted 7, 87% out of 127 cow pneumonic lungs, incidence rate which is agreement with result that were recorded by [10,20]. actinomycotic granulomatous type pneumonia

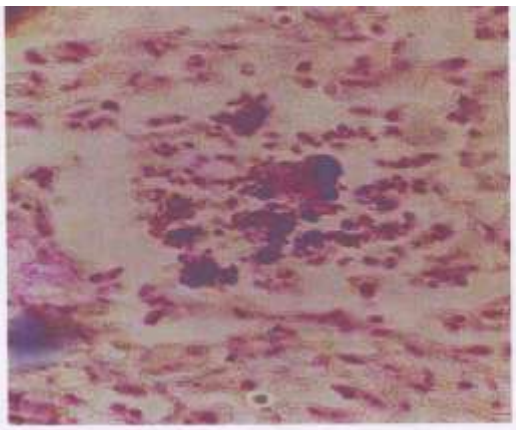

Fig.1: Actionmycotic granulomatous pn. showing rosette shape of G+ bacteria colonies club. Like structure surrounding present outside macrophages lymphocyte fibrous tissue. BXB(X330).

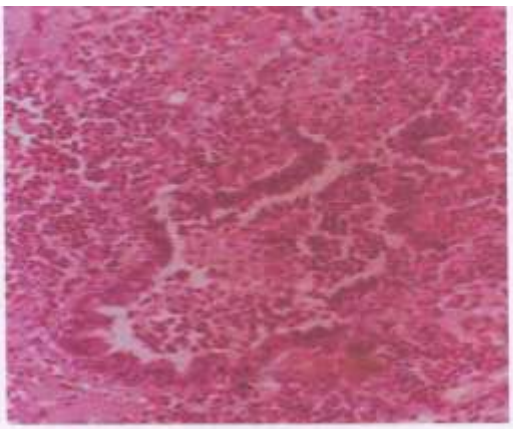

Fig.2: Show supp.bronchopn., notice supp. Exudates intrabronchial cavity & its adjacent Alveoli. H&E(X660).

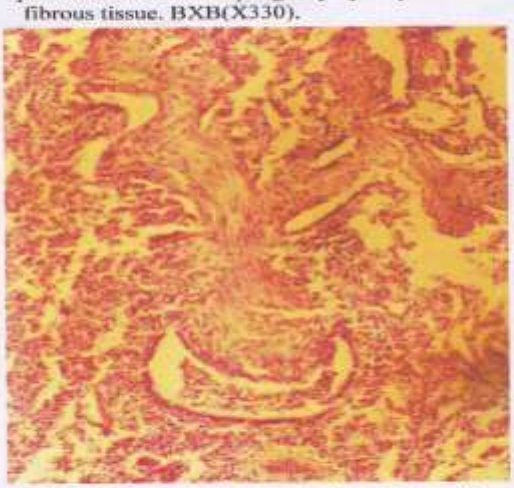

Fig.3: Show streaming.macrophages(oat-cell) As continous cells bundle amonge alveoli, Spindle shape. H&E(X 1320).

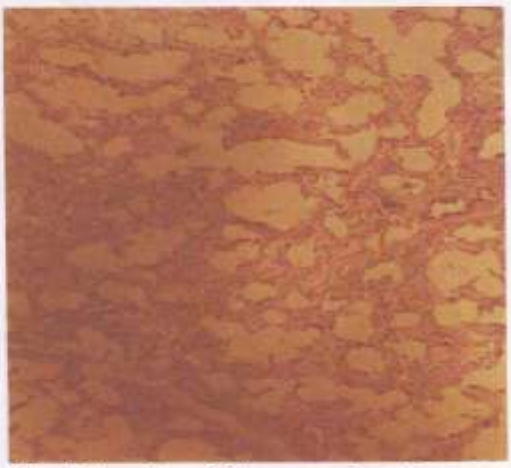

Fig.4: Show interstitial pneumonia, notice thickening of inter alveolar septae. H&E(X330)

appeared in 2 case. however, in other study was recorded only one case [9]. via, using brown and brenn stain(B&B) , showed bacterial colony of G+ve bacteria appeared as clubbed – colony.

In chronic pneumonia, the main features observed were the replacement of the lung parenchyma by means of fibroplastic proliferation .this view has been supported by [23].

Among the non-suppurative pneumonia, hemorrhagic pneumonia is of special interest .it may be that physical factor like struggling of the animal at the time of slaughter may have causes hemorrhage in the organ and consequently given rise to this change.

Table 1: Incidence of various type of bovine pneumonia in (127) lungs.

	Type of pneumonia	Total No. of cow showing lesion	Percentage%
1	**Suppurative pneumonia** a- Fibrino purulent pneumonia b- Acute suppurative pneumonia c-Acute broncho pneumonia d- Aspiration pneumonia	 21 12 7 5	 16,53 9,45 5,51 3,94
2	**Non suppurative – pneumonia** a -Lymphoid pneumonia b-Fibrinous pneumonia c- Acute hemorrhagic pneumonia	 5 24 3	 3,94 18,90 2,36
3	**Chronic interstitial pneumonia**	31	24,41
4	**Chronic broncho pneumonia**	3	2,36
5	**Chronic granulomatous pneumonia**	10	7,87
6	**Chronic pneumonia**	6	4,72
		127	100 %

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الخلاصـــة

لقد تم فحص ١٢٣٤ رئة لابقار تبدو ظاهريا سليمة قبل الذبح ,ذبحت في مجزرة البصـــرة للفترة من كانون الثاني ٢٠٠٥ لغاية حزيران ٢٠٠٥.اظهر الفحص العياني اصابات بالتهـــاب الرئة في ١٢٧ عينة حضرت لغرض الفحص النسيجي واخـــذت منهـــا شـــرائح ٦مـــايكرون وصبغت بالهيماتوكسلين والايوزين.

ان التهاب الرئة صنف بناءا على نوع النضح الالتهابي ,التفاعلات الرئوية بالاضافة الـــى فترة الافة. الالتهاب الرئوي وبناءا على الترتيب التنازلي لنسبة الحدوث يصنف الى ذات الرئة الخلالي ,ذات الرئة الليفيني القيحي ,ذات الرئة القيحي الحاد,ذات الرئة الحبيبي المزمن, ذات الرئة القصبي الحاد,ذات الرئةاللمفاوي ,ذات الرئة المزمن.ان نسبة حدوث ذات الرئـــة فـــي الابقار بناءآ على المعايير النسيجية في هذه الدراسة هي ٩٠،٩٥%. وان دور هذه الافات فـــي الابقار تمت مناقشتها.