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# A STUDY ON CAPRINE PNEUMONIA IN IRAQI LOCAL GOATS - ETIOLOGICAL FINDINGS

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## SUMMARY

In a study designed to evaluate the prevalence of caprine pneumonia and to identify it's bacterial and parasitic causes , 100 lungs with pneumonic lesions were collected. The prevalence rate was 12.5%. The most commonly associated bacterial isolates with the suppurative and interstitial pneumonia were the followings: *Staphylococcus aureus and Streptococcus haemolyticus* (x,B), while the most commonly associated bacterial isolates with fibrinous and fibrino - purulent pneumonia was *Pasteurella haemolytica*.

The most commonly associated parasite in chronic purulent and muco - purulent pneumonia *was Dictyocaulus filaria*, in cases of chronic interstitial pneumonia were either *D. filaria or Muellerius capillaris* and in cases of chronic granulomatous pneumonia were a combination of *D. filaria* and *M. capillaris*.

Four miscellaneous parasitic lung lesions were reported, three of which were hydatid cysts *(Echinococcus granulosus)* and the fourth one was due to liver fluke *(Fasciola gigantica)*.

## INTRODUCTION

Pneumonia as a disease, is well known for it's high economical losses among goats and it's complex

causation(1). From our visits to Baghdad slaughter houses we realized the significance of the disease among local Iraqi breed of goats.There is no report on the prevalence of caprine pneumonia in Iraq, nor any attempt to identify it's two main causes i.e bacterial and parasitic causes, eventhough such studies have been carried out in many parts of the world (2,3,4,5,6). Therefore, this study is aimed at 1) reporting the prevalence of caprine pneumonia and 2) identification of both bacterial and parasitic species associated with the disease.

## MATERIALS AND METHODS

Hundred pneumonic lungs were collected through the examination of a total of 800 goats slaughtered at Al-Dawra and Al-Shaula abattoirs.

For bacteriological studies, pieces of affected lungs were taken aseptically and brought to the laboratory in sterile Petri dishes, then directly smeared on culture media (blood agar, MacConkey agar and trypticase soy broth) and incubated for 2 days. The bacterial colonies were purified and finally the culture isolates were identified by their morphological, cultural and biochemical characters as described by Carter (7).

For parasitological studies, pneumonic lungs were opened and all visible worms were examined to identify their species. For Protostrongylidae group of parasites which live in the pulmonary parenchyma, incisions were made in the affected areas (nodules) then direct smears were made to identify the characteristic first stage larvae (2). Further identification of these larvae was achieved during examination of the histological sections (8).

## RESULTS

The prevalence rate of caprine pneumonia was 12.5%. The prevalence of bacterial pneumonia was 47% and of the parasitic type was 51%.

The most commonly identified bacterial isolates were :

28 isolates of *Staphylococcus aureus* (31%), 27 isolates (30%) of *Streptococcus haemolyticus* (7α,20β), 12 isolates of *Pasteurella haemolytica* (13.33%) and 6 isolates of *Escherichia coli* (6.66%). Other minor isolates of various bacterial genera are also encountered (Table 1).

Regarding the association of the most common bacterial isolates with various types of pneumonia, they were as follows: *Staph. aureus and Strept. haemolyticus* (α,β) in the case of suppurative and interstitial pneumonia and *Past. haemolytica* in the case of fibrinous and fibrino-purulent type pneumonia.

The most commonly identified parasites were, 32 cases of *Dictyocaulus filaria* (62.74%), 19 cases of *Muellerius capillaris* (37.25%) ( in most cases was found in combination with D. filaria ) and 7 cases of *Protostrongylus rufescens* (13.72%). There were also 3 cases of verminous pneumonia that we failed to identify the type of the causative parasite (Table 2).

Regarding the association of the parasites with the various types of pneumonia, they were as follows: *D. filaria* alone in the case of chronic purulent and muco-purulent pneumonia, both *D. filaria and M.capillaris* in case of chronic interstitial and chronic granulomatous pneumonia.

Four miscellaneous parasitic lung lesions were also encountered, three of which were due to hydatid cysts *(Echinococcus granulosus)* and the fourth one was due to liver fluke *(Fasciola gigantica)*.

## DISCUSSION

Pneumonia is considered to be the most frequent disease associated with high economic losses among goats (6). In the present study, the prevalence rate of caprine pneumonia was 12.5%. This figure differed from what was reported in other parts of the world (9). Indeed some differences were also reported at different parts of the same country (1,10). This difference in the prevalence of the disease may be due to many factors such as differences in the temperature, humidity, breeding, stress factors and the type of management.

Table 1 : Bacterial isolates from naturally-occurring pneumonic lesions of goats.

| Types of bacteria | Types of pneumonia (47 cases) | | | total | percentage % |
|---|---|---|---|---|---|
| | supp.pn. (32 cases) | fib.and fib-pur. pn.(8 cases) | interst.pn. (7 cases) | | |
| *Staph. aureus* | 19 | 5 | 4 | 28 | 31 |
| *Strept. haemolyticus* (7α,20β) | 19 | 4 | 4 | 27 | 30 |
| *P. haemolytica* | 6 | 6 | - | 12 | 13.33 |
| *E. coli* | 5 | 1 | - | 6 | 6.66 |
| *C. pyogenes* | 3 | - | - | 3 | 3.33 |
| *Micrococcus Spp.* | 1 | - | 2 | 3 | 3.33 |
| *Staph. epidermidis* | 1 | - | 1 | 2 | 2.22 |
| *Mima polymorpha Var oxidans* | 1 | - | 1 | 2 | 2.22 |
| *p. multocida* | - | - | 2 | 2 | 2.22 |
| *Serratia Spp.* | 1 | - | - | 1 | 1.11 |
| *C. ovis* | 1 | - | - | 1 | 1.11 |
| *C.xerosis* | 1 | - | - | 1 | 1.11 |
| *Proteus vulgaris* | 1 | - | - | 1 | 1.11 |
| *Bord. bronchiseptica* | - | 1 | - | 1 | 1.11 |

Table 2 : Parasites identified from naturally-occurring pneumonic lesions of goats.

| Type of parasite | A) types of verminous pneumonia (47 cases) | | | | | |
|---|---|---|---|---|---|---|
| | Chr.pur and muco-pur.pn.(27 cases) | Chr.interst.pn. (10 cases) | Chr.gran. pn.(8 cases) | Ch.non-supp. pn. (2 cases) | total | percentage % |
| *D.filaria* | 14 | 5 | - | 1 | 20 | 39.2 |
| *D.filaria and M.capillaris* | 5 | 1 | 5 | - | 11 | 21.56 |
| *D.filaria, M.capillaris P.rufescens* | 1 | - | - | - | 1 | 1.96 |
| *M.capillaris* | 2 | 4 | - | - | 6 | 11.76 |
| *P.rufescens* | 4 | - | 1 | - | 5 | 9.80 |
| *M.capillaris and P.rufescens* | 1 | - | - | - | 1 | 1.96 |
| Unidentified parasitic lesions | - | - | 2 | 1 | 3 | 5.88 |

| | B) Miscellaneous, parasitic pulmonary lesions (4 cases) | | |
|---|---|---|---|
| *Echinococcus granulosus* | Hydatid cysts | 3 | 5.88 |
| *Fasciola gigantica* | Liver fluke | 1 | 1.96 |

Regarding the type of the organisms, we encountered *Staph. aureus and Strept. haemolyticus* (α,β) as the most common bacterial isolates associated with suppurative and interstitial pneumonia (19 and 4 isolates respectively). The same organisms were isolated from the same types of naturally-occurring (1,6) and experimentally-induced (11) pneumonias. Other organisms isolated from these two types of pneumonia were : *P. haemolytica* (6 isolates), *E. coli* (5 isolates) and *Corynebacterium pyogenes* (3 isolates). These organisms were also isolated before (1, 9). There are also rare bacterial isolates such as *C. xerosis, C.ovis and P. multocida* and others were isolated from suppurative pneumonia and were also isolated by others (1,4,5,12).

The most common bacterial isolate associated with fibrinous and fibrino-purulent pneumonia was *P. haemolytica*. The same organism has been also isolated from natural and experimental pneumonia (13,14). Other organisms isolated from this type of pneumonia were *Staph. aureus and Strept. haemolyticus* (α,β) in addition to *P. haemolytica*. These organisms are well known pyogenic organisms (15).

We encountered one isolate of *Bordetella bronchiseptica*. There is no previous report of the isolation of this organism from caprine pneumonia except for that of Carter (7) who isolated it from equine and bovine pneumonia.

Regarding parasitic pneumonia, the most commonly identified parasite was *D. filaria*, found alone(32 cases) or in combination with *M.capillaris* (12 cases). *Protostrongylus rufescens* was found in 7 cases only. The fact that *D. filaria* was the most frequent lung worm associated with verminous pneumonia, indicates that goats are quite sensitive to infection with this parasite (16,17,18). Gerichter (2) thought that certain predisposing factors increase the susceptibility of goats to infection with this parasite, mainly the short life cycle of the parasite, with no need for intermediate host which is required for other lung worms to reach the infective stage.

Cases of chronic interstitial pneumonia were associated with the presence of both *D. filaria and M. capillaris*. The relation of a combination of these two parasites to

this type of pneumonia was reported before (8,19).

In other cases, the combined infection with *D. filaria and M. capillaris* was associated with a chronic granulomatous type of pulmonary response. The relation of these parasites to this type of pneumonia was described by other investigators (3,20). Li (20) reported that larvae,ova and degenerate parasites act as foreign bodies and hence inducing pneumonic lesions (granulomas).

Four miscellaneous parasitic lung lesions were reported. They were due to hydatid cysts *(Echinococcus granulosus)* and the liver fluke *(Fasciola gigantica)*. It is known that goats can serve as intermediate host for the tape worm *Echinococcus granulosus* (21). The presence of lung lesions due to the liver fluke is considered as an incidental finding and probably occurred through the migration of immature flukes from the liver to the lungs (22).

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# دراسة عن مرض ذات الرئة في الماعز المحلي- المسببات

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## الخلاصة

صممت هذه التجربة لتقييم حدوث ذات الرئة في الماعز وتحديد مسبباتها الجرثومية والطفيلية. لهذا الغرض جمعت (١٠٠) رئة بها ذات رئة.

لقد وجد بأن حدوث المرض كان (٥ر١٢٪) اما اكثر الجراثيم شيوعا صحية ذات الرئة القيحية والخلالية فكانت عزلات:- *Staphylococcus aureus & (α,β) hemolytic Streptococci* وقد كانت أشيع الجراثيم المصاحبة لذات الرئة الليفينية القيحية *Pasteurella haemolytica*.

كان الطفيلي *Dictyocaulus filaria* هو الاكثر شيوعا صحية ذات الرئة القيحية المزمنة وذات الرئة القيحية المخاطية المزمنة، اما حالات ذات الرئة الخلالية المزمنة فقد شخص منها الطفيليان *Muellerius capillaris* و *D.filaria* وصاحب حالات ذات الرئة الورمية الحبيبية المزمنة الطفيليان D.filaria و M.capillaris . صادفنا اربعة آفات طفيلية رئوية متفرقة ثلاثة منها بشكل اكياس عدرية اما الرابعة فقد وجد أن سببها هو حلزون الكبد من نوع *Fasciola gigantica*.