

THE PREVALENCE OF LUNG LESIONS IN DROMEDARY AT SLAUGHTERHOUSE IN MOROCCO

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1. INTRODUCTION

In Morocco, camel population which is around 149,400 dromedaries, plays a significant role in supplying the population of saharian regions with meat and milk. In this species, respiratory pathology is common and has been reported from several countries (Abdel Rahim *et al.*, 1990; Arora & Karla., 1973; Farrag *et al.*, 1987). However, and in spite of isolation of a variety of infectious agents, the definitive and precise etiology of most respiratory diseases has yet to be determined. It is important to mention that despite their mainly subclinical course, lung affections are considered to be of great economic importance. In dead these affections reduce growth rate and feed efficiency.

Until now, in Morocco, except a few disparate data, the prevalence of respiratory diseases in camel is lacking. Therefore, we aim to examine slaughtered camels in order to determine the type, extent, prevalence and etiology of lung lesions in this species.

2. MATERIAL AND METHODS

This study was conducted in the slaughterhouse of Lâayoune (southern part of Morocco) during the period January-August 1999. The main criterion for choosing this abattoir was the large number of slaughtered dromedaries per week (around 40 camels, aged between 6 and 13 years).

2.1. Pathology

Lungs and pleura were examined for gross lesions. Lesions were grouped as follows: pneumonia, pleuritis, parasitic lesions, abscesses and other

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findings. Lung specimens with lesions were collected and fixed in 10 % neutral formalin and processed for histopathology. Paraffin tissue sections were cut at 5µ thickness and stained by hematoxylin and eosin (H&E).

2.2. Bacteriology

At slaughterhouse, two specimen types were collected for bacteriological examination:

- Swabs of pleura lesions were aseptically collected using a sterile cotton swab (culturette, Marion Scientific). They were immediately placed into a sterile Tryptose-Soja broth supplemented with 5% horse serum.
- Samples of lung and pleura lesions were aseptically collected and placed into sterile plastic vials.

Both specimens were kept at -20°C until arrival to the Microbiology Laboratory at the Institut Agronomique et Vétérinaire Hassan II, Rabat. They were cultured on blood Agar (Difco) Petri-dishes and incubated in aerobic conditions for 24 to 72 hours at 37°C. Smears were prepared from bacterial colonies and Gram stained. Identification of bacterial isolates was conducted using conventional biochemical tests (Carter, 1979).

3. RESULTS

3.1. Prevalence of macroscopic lesions

A total of 434 lungs were examined. The prevalence of different lung lesions is presented in table 1. Gross lesions were found in 148 (34.1 %) of the inspected lungs. The most frequent finding was hydatidosis with 62 (14.3 %) affected lungs, followed by pneumonia with 47 (10.8) affected lungs and pleuritis with 30 (6,9 %) cases. Lung abscesses were observed in 5 (1.2 %) lungs and linear scars in only 4 (0.9 %).

Table 1. Prevalence of lung lesions

Gross diagnosis	Number of lungs	%
No gross lesions	286	65.9
Hydatid cysts	62	14.3
Pneumonia	47	10.8
Pleuritis	30	6.9
Abscesses	4	0.9
Linear scars	5	1.2

3.2. Gross pathology

3.2.1. Hydatid cysts

Macroscopic lesions associated with *Echinococcus granulosus* larvae appeared as single to multiple cysts (1 to 10 cysts per lung) involving one

or more lung lobes. These cysts varied in size from 1 to 8 cm in diameter and were whitish and glistening.

3.2.2. *Pneumonia and pleuritis*

Lobar pneumonia was frequently observed in affected lungs, and involved apical or diaphragmatic lobes. Affected lobes were entirely or have their major portions diffusely and uniformly consolidated. Depending on stage of evolution, the consolidated areas were red (hepatization) or red-brown to gray in colour. Sections of consolidated areas had a dull and dryish appearance, and in some cases the section was moist and a mucopurulent or purulent material that could be expressed from airways. Pleuritis was observed alone or in association with pneumonia. In most cases, the lesion was a severe, diffuse pleuritis with congestion, hemorrhages and fibrin deposit mostly in the anterior mediastinum.

3.2.3. *Other lesions*

Abscesses were observed in 4 (0.9%)lungs and were sized from 5 to 8 cm in diameter. Linear scars were noted in 5 (1.2%) and consisted of whitish retracted variable sized areas

3.3. Histopathology

3.3.1. *Hydatid cyst*

The wall of the hydatid cyst was formed by an inner layer (germinative layer) which consisted of a lamellar-chitinous ring and presented the cuticle larval form of *T. echinococcus* where scolex were attached in some areas. The outer layer or pericyst consisted of a dense infiltrate of mononuclear inflammatory cells (host reaction). A thick fibrotic tissue appears between these two layers.

3.3.2. *Pneumonia*

In acute and subacute cases of pneumonia, alveolar spaces were hemorrhagic or filled with a serofibrinous exudate and a large number of neutrophils mixed with some macrophages. The subpleural, interlobular perivascular, and peribronchiolar connective tissue was distended by a serofibrinous exudate and inflammatory cells. In advanced cases, histological changes were characterised by a heavy macrophagic infiltration and fibrosis.

3.4. Bacteriology

Haemolytic *Staphylococcus aureus* was isolated from 3 cases of fibrinous pleuritis non-associated with pneumonia. Non haemolytic *Staphylococcus aureus* was isolated from one lung abscess.

4. DISCUSSION

Hydatidosis (14.3 %), was the main macroscopic finding in slaughtered camels. This prevalence is a lot more higher than 1.6 % reported by Kachani *et al.* (1997) in a study conducted in the same slaughterhouse (Lâayoune) during the period 1995-1996. According to the same author, this low percentage could be related to the young age (10 to 12 months) of dromedaries slaughtered at the study period (January –March) which coincides with time of year where herdsmen sell their camels. In fact this author mentioned that the local veterinarians reported seeing more cases in adult camels. However, our prevalence was very low if compared to 80 % reported by Pandey *et al.* (1986) on a study conducted on camel slaughtered in Rabat, which is a town of the north part of Morocco. These discrepancies in prevalence are probably related to the age and origin of examined dromedaries. Despite their differences, these results provide strong evidence of the important role played by feral dogs as definitive hosts in transmitting and maintaining this zoonosis that continues to present a major health and financial problem in Morocco.

In our survey, the prevalence of pneumonia was 10.8 %. Several authors in different countries also reported this high percentage. Abdel Rahim *et al.* (1990) found that 50 % of examined dromedaries (204) at slaughterhouse in Libya presented lung lesions due to hydatid cysts and pneumonia. In India, Arora & Karla (1973) reported that the percentage of dromedaries affected with bronchopneumonia could reach 30 %. Agab & Abbas (1998) found that during autumn season, 7.9 % of dromedaries in eastern Sudan were affected with pneumonia. Several bacteria have been incriminated including *Klebsiella pneumonia* and *Hemolytic Diplococci* (Arora & Karla, 1973). *Pasteurella multocida* type A could also be involved. In fact, Fassi-Fehri (1987) cited that the results of three serological surveys conducted on camel in Chad, Ethiopia and in Niger have shown the average percentages of camels serologically positive for this bacteria were respectively 80.5 %, 64.6 % and 59.58 %. Parainfluenza virus type 3 (PI 3) infection could also play an important role in these affections due to the high percentage of seropositive camels for this agent (Maurice *et al.*, 1968). Complications with other micro-organisms such as *Corynebacterium pyogenes* (Farrag *et al.*, 1953) and *Streptococcus* (Hoste, 1985) have been reported.

Haemolytic *Staphylococcus aureus* has been isolated from 3 cases of fibrinous pleuritis non-associated with pneumonia. No data are available in the literature regarding this finding. We suspected that this germ was brought either by hematogenous route or by the approximate to the pleura of infected lesions. In fact a non haemolytic *Staphylococcus aureus* was isolated from a lung abscess. All the isolates were recovered from swab

specimens and not from tissue samples. This explain the absence of isolates from pneumonia lesions from which only tissue samples were examined.

5. CONCLUSION

Surveying lung lesions of camel at slaughter is a valuable tool in assessing the frequency of respiratory disease in this specie, which appears to occur frequently according to the slaughter reports from various countries. Generally, in camels stressful conditions are known to lead to the increased incidence of pneumonia among dromedaries and apparition of respiratory disease outbreaks. The most important predisposing factors include sudden climatic changes, poor management practices, low level herd health status and bad nutrition. In fact, several authors have reported that outbreaks of pneumonia occurred frequently in rainy and cold season. Further research is needed to identify the etiological agents involved in camel respiratory diseases.

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