

Plates were examined for characteristic colonies of *C. renale*. Pure colonies were obtained by subculturing on BA plates. Smears from the growths were stained by the Gram technique for identification of cellular morphologies. *C. renale* was identified as described elsewhere (4, 5).

### Results and discussion

Out of the 40 urinary bladder urine samples examined *C. renale* was isolated from 5 (12.5 %) of the samples. Of the 24 samples from the males, 4 (16.7 %) were positive and among the 16 female samples, 1 (6.3 %) was positive. The difference in the infection between the male and female cattle was statistically significant ( $P < 0.001$ ).

*Corynebacterium renale* has been isolated from both apparently healthy cows and from cows showing signs of pyelonephritis in other parts of the world. The isolation of *C. renale* from an infected kidney and some urine samples in cattle (1) and from urinary bladder samples of cattle in this study shows that the organism is not restricted to temperate zones. Although *C. renale* infection is more common in female cattle than in males (3), this study has shown that males can also be infected to some extent.

### Acknowledgements

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FATIHU (M.Y.), ADDO (P.B.). Isolation of *Corynebacterium renale* from slaughtered cattle at the Zaria abattoir in Nigeria. *Revue Élev. Méd. vét. Pays trop.*, 1991, **44** (2) : 160-161

Forty urinary bladders were collected from apparently healthy cattle slaughtered at the Zaria abattoir. Twenty-four (60 %) were from male animals and 16 (40 %) from females. Urine samples were obtained and cultured for *Corynebacterium renale*. Four (16.7 %) of the samples from males and 1 (6.3 %) from females were positive. The difference in infection between the sexes was statistically significant ( $P < 0.001$ ). *Key words* : Slaughtered cattle - Urine sample - *Corynebacterium renale* - Nigeria.

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## Association of *Klebsiella* organisms with pulmonary lesions in sheep

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GAMEEL (A.A.), EL-SANOUSI (S.M.), AL-NAWAWI (F.), AL-SHAZLY (M.O.). Association de *Klebsiella* avec des lésions pulmonaires chez le mouton. *Revue Élev. Méd. vét. Pays trop.*, 1991, **44** (2) : 161-164

De petits nodules ont été vus sur la paroi thoracique et les poumons de moutons provenant de l'abattoir d'Al-Ahsa en Arabie Saoudite. *Klebsiella pneumoniae*, sous-espèce *ozaenae*, a été isolée et identifiée. L'histopathologie des nodules est décrite. *Mots-clés* : Mouton - *Klebsiella* - Lésion pulmonaire - Isolement - Identification - Arabie Saoudite.

### Introduction

*Klebsiella* organisms can be found as saprophytes in soil and water and in the genital, respiratory and digestive tract of healthy animals (2, 4, 10). It has been stated as a cause of contagious metritis, abortion and sterility in equines (6, 9, 16, 17) and mastitis in cattle (14, 18, 19). It has also been isolated from cases of diarrhoea and suppurative lesions in foals (7, 12), pneumonia in goats (8), gangrenous mastitis in ewes (11), diarrhoea and urinary tract infections in dogs (5, 13, 15) and metritis and mastitis in pigs (2).

The present communication describes pulmonary lesions caused by *Klebsiella* organisms in sheep slaughtered at the Al-Ahsa abattoir, Saudi Arabia.

### Materials and Methods

Small nodules were occasionally seen on the chest wall and in the lungs of sheep slaughtered at the Al-Ahsa abattoir, Saudi Arabia. These were associated with pleural adhesions, adhesions between lungs and diaphragm and enlargement of regional lymph nodes. The lesions were examined and samples from lungs and mediastinal lymph nodes were fixed in 10 % formalin for histopathology. Representative samples were taken for bacteriology. The present study was based on six cases.

### Pathological methods

Tissue samples were processed in paraffin and sections stained with haematoxylin and eosin (HE), Ziehl-Neelsen (ZN) stain and periodic acid schiff method (PAS).

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## Communication

### *Bacteriological methods*

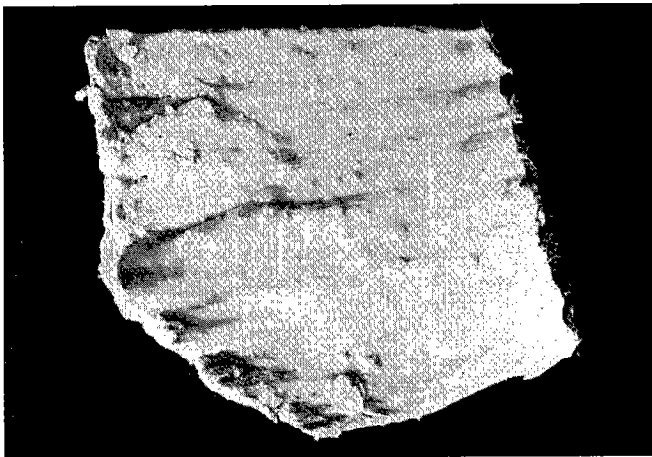
Smears were prepared from lung nodules and mediastinal lymph nodes, heat fixed and stained with Gram's and ZN stains. The nodules were incised with a sterile blade and the cut surface inoculated in 10 % sheep blood agar. Conventional bacteriological procedures were applied. Identification of isolates was made according to COWAN (3) and KREIG and HOLT (12).

### **Results**

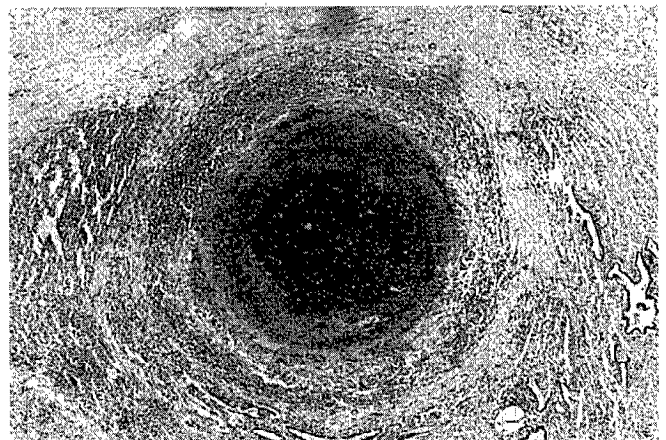
The nodules on the chest wall and in the lungs were glistening white in colour, firm with smooth appearance and measured about 2-5 mm in diameter (photo 1). They projected from the lung surface under the thickened raised

pleura. Surrounding lung tissue was rather consolidated and difficult to cut. The nodules contained yellowish inspissated cheesy material with granular appearance. The mediastinal lymph nodes were markedly enlarged and rough surfaced. The cut surface had a yellowish granular appearance.

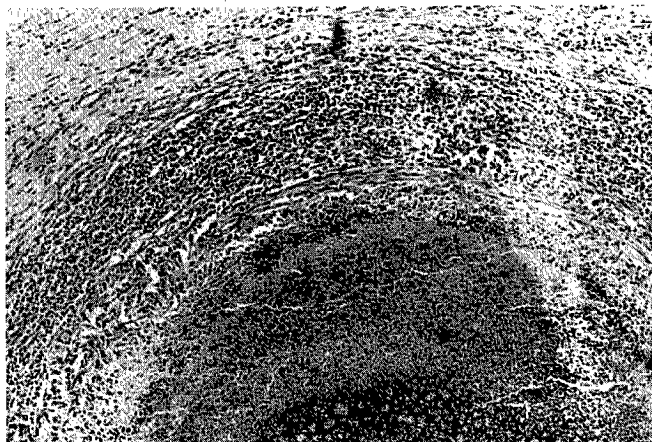
Histopathological examination of lung sections showed well encapsulated caseous nodules with distinct layers ; a central rather loose zone of necrosis followed by a more compact necrotic layer, then a narrow zone of infiltrating neutrophils followed by a cellular connective tissue layer containing mononuclear cells and outermost by a relatively less cellular connective tissue capsule. Surrounding lung tissue was atelectatic (photos 2, 3). Hypertrophy of alveolar cells, hyperplasia of bron-



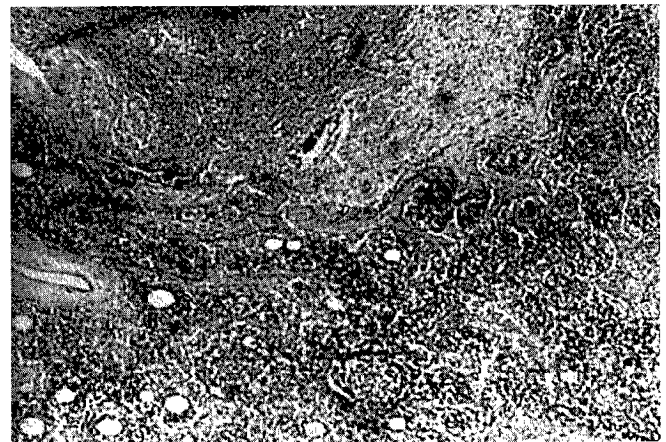
*Photo 1 : Chest wall of sheep showing nodules.*



*Photo 2 : Lung section showing necrotic nodules with caseated centers, a narrow layer of neutrophil infiltration surrounded by a cellular zone of connective tissue and then by a less cellular connective tissue layer. Note atelectatic surrounding lung tissue (x 32,5).*



*Photo 3 : Lung section showing caseated nodules. See photo 2 for legend (x 65).*



*Photo 4 : Mediastinal lymph node showing necrotic nodules with caseated centers and outer connective tissue capsule (x 65).*

chial epithelium and presence of suppurative exudate in bronchi were also seen. Pleura was thickened with fibrosis.

Similar caseated nodules were seen in lymph node sections, some coalescing to form diffuse irregular areas of necrosis replacing normal lymphoid tissue (photo 4). Sections stained with ZN or PAS were negative for acid-fast organisms or fungi.

#### Bacteriological findings

One type of bacteria was isolated in the pure form ; the biochemical results are presented in table I. The organism was diagnosed as *Klebsiella pneumoniae* subspecies *ozaenae* (12).

TABLE I Biochemical results with *K. pneumoniae* subspecies *ozaenae* isolated from lung.

Test	Results
Growth on MC	+
Catalase	+
Oxidase	-
Urease	(+)
Indole	-
M.R.	+
V.P.	-
Gelatin	-
Citrate	(+)
Glucose	+ Trace of gas
Arabinose	-
Lactose	(+)
Dulcitol	-
Maltose	+
Mannitol	+ Trace of gas
Rhamnose	+
Xylose	+
Sucrose	(+)
Sorbitol	-
Salicin	-
Malonate	-
Lysine	-

(+) = positive after 7 days incubation.

#### Discussion

*Klebsiella pneumoniae* subspecies *ozaenae* was the only organism isolated from the lung nodules in the pure form. *K. ozaenae*, previously described as a separate species, now considered as a metabolically inactive biogroup (subspecies) of *K. pneumoniae* (12). The organism may not be easily classified due to the great variability in biochemical characters (1). Thus the present strain was only able to ferment lactose and sucrose, hydrolyse urea and utilize citrate as sole source for carbon after continuous incubation for seven days at 37 °C. Moreover, in the absence of serology it is difficult

to distinguish a metabolically active strain of *K. pneumoniae* subspecies *ozaenae* from a strain of *K. pneumoniae* (12).

*K. pneumoniae* has been evidenced as a cause of contagious metritis, abortion and sterility in equines (10, 16, 17) and mastitis in cattle (14, 18, 19). It has also been isolated from cases of diarrhoea in foals (6), pneumoniae in goats (8) and gangrenous mastitis in ewes (11). In dogs the organism has been associated with diarrhoea and urinary tract infections (5, 13).

Information on the association of *Klebsiella* organism with pathological conditions in sheep appears to be scanty and the present report suggests that such infections could be prevalent.

GAMEEL (A.A.), EL-SANOUSI (S.M.), AL-NAWAWI (F.), AL-SHAZLY (M.O.). Association of *Klebsiella* organisms with pulmonary lesions in sheep., *Revue Elev. Méd. vét. Pays trop.*, 1991, **44** (2) : 161-164

Small nodules were seen on chest wall and in the lungs of sheep slaughtered in Al-Ahsa abattoir, Saudi Arabia. *Klebsiella pneumoniae* subspecies *ozaenae* was isolated and characterized. The histopathology of the nodules was described. **Key words** : Sheep - *Klebsiella* - Pulmonary lesion - Isolation - Identification - Saudi Arabia.

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