دراسات تجريبية وصحة شام بمرض السل الكبادب
في الأغنام في مصر العليا

جمال مرزق، طه العلاوي، ماهر زكي، سعيد العمروسي

تم فحص 3822 خرفاً فحصاً أكليبيًا للغدد الذي أظهر وجود 127 غدد بـ
تغمض في هذه الغدد.

أما العدد بواسطة الحقل بالميكروبر تحت الجلد في الجلد فقد أمكن مزيل
الميكروبر من هذه الإماكن فقط ولم يشع وحده حالة تجريح البلد.

وفي حالة العدد وعند طريق الاضائة أمكن مزيل الميكروبر من الرئة لحيوان واحد
بينما في حالة العدد وعند طريق الاضائة فقد أمكن مزيل الميكروبر من عدد الإماك.

والنسبة للعدود وعند طريق الوريج فقد ينتج من ذلك وجود خراش في كل
من الحال والكبد وعدد الإماك.

* : قسم السكريولوجيا - كلية الطب البيطري - جامعة أسوان.
رئيس القسم: أ.د. عماد كامل نافع.
INCIDENCE AND EXPERIMENTAL STUDIES OF CASEOUS LYMPHADENITIS IN UPPER EGYPT.
(WITH 2 TABLES)

BY
G. AZIZ, T. EL-ALLAWY, M. ZAKI and S. EL-AMROUSI
(Received at 14/6/1981)

SUMMARY

Clinical examination of 3822 sheep revealed enlargement of lymph nodes in 167 heads' (4.3%), higher percentage of infection in parotid gland (49.4%).

Corynebolus was isolated from one enlarged parotid lymph node of one sheep out of 13 slaughtered ones.

Experimental infection by subcutaneous and intradermal inoculation revealed isolation of C. vialis from site of inoculation only, it was not isolated in case of scarification method.

Intranasal infection resulted in isolation of C. vialis from lungs of one animal only while in case of oral infection, C. vialis was isolated from the mesenteric lymph nodes.

Intravenous injection resulted in abscess formation in spleen, liver and bronchial lymph nodes.

INTRODUCTION

Caseous lymphadenitis is a chronic disease of sheep and goat causing great economic losses in animals either for the affected animals or in wool production. The difficulty in early diagnosis makes it as a complicated problem. In Egypt, caseous lymphadenitis affects about 10% of sheep population (The academy of scientific research and technology, Egypt).

Concerning distribution of the disease in lymph nodes, MARCH (1958) reported that preascapular and precural lymph nodes of affected animals are most commonly affected, then mediastinalis, bronchialis and sublumbers. Finally, all lymph nodes are affected. JONES (1961) stated that lesions were found in lungs and lymph nodes and also kidneys as well as other viscera are affected.

For the diagnosis of the disease, AWAD (1960) in Sudan used the agglutination test to investigate pseudotuberculosis infection in sheep and reported promising results. Other serological tests were tried by ZAKI (1968) and ZAKI and ABDEL HAMID (1974).

In the field of epizootiology of caseous lymphadenitis, CARNE (1932) described ingestion as a possible method of infection and the organism was recovered from ovine faeces.

With respect of experimental studies, many investigators tried the (I/V) inoculation. CARNE ET AL. (1972) used a dose of $3 \times 10^6$ that resulted in abscess formation in lungs and kidneys and death of some sheep. Another concentration was tried by ADDE (1979) who used $4 \times 10^8$ aiming to study the pathological lesions by (I/V) route.

The aim of the present study was designed to study the distribution of infection in lymph nodes of clinically infected and slaughtered sheep as well as experimental infection to clarify the aspects of the epizootiology of the disease in upper Egypt.

MATERIALS AND METHODS

Animals:

a. Field cases: 3822 sheep between 6 months to 2 years in Assiut Governorate were examined clinically. Swabs were made from nostrils, hairless areas of skin surface and also from lesions (i.e) abscessed lymph nodes or any other suppurative lesions. Water samples of some pens were also collected.

b. Slaughtered sheep: A total of 33 sheep (22 males and 9 females) were examined at Assiut abattoir for both ante and post mortem. Samples were collected for bacteriological examination from superficial and internal deeply lymph nodes that showed pathological lesions.

G. AZIA, ET AL.

a- Laboratory animals: Guinea pigs weighing 200-250 gms were used for carrying out the pathogenicity test.

b- Sheep for experimental infection: 14 Oseemy sheep (1-3 years old) were obtained from a private farm, Assiut province, where history indicated no previous infection, were used for experimental infection. The animals were divided into 7 pairs.

c- C. ovis culture for experimental infection: A virulent C. ovis broth culture was obtained from Central Laboratory of Animal Health and Research, Dokki, Cairo. It was standardized to contain $10^{19}$/ml.

II- Methods:

a- Procedures adopted for sampling and culture: Swabs were taken from nasal, faecal matter, surface soil of some pens and also from inner thigh of both clinically normal and infected sheep. Bacteriological studies were carried out with special reference to specific methods of Coryne ovis isolation and identification. These were carried out according to CRUICKSHANK (1952).

b- Experimental infection of sheep: 7 pairs of oseemy sheep were experimentally infected by a 48 hours virulent C. ovis broth culture (contained $10^{19}$ organisms /ml). The first 5 pairs were inoculated by 3 ccs subcutaneously, 3 ccs intradermal, 3 ccs intranasal, 3 ccs by scarification and 10 ccs by oral route. One animal of the 6th pair received (I.V) inoculation of C. ovis broth culture, the other received 50 ml broth culture. The last pair (7th) was left as a control, and inoculated with peptone water by different routes. A week later these groups were given a second identical dose by the same routes.

RESULTS

I- Field cases:

The clinical examination of 3822 sheep of different ages revealed enlargement of lymph nodes in 167 heads (4.3%). Higher percentage of infection was noticed in the parotid lymph nodes of 87 heads (49.4%). Cultures of swabs from affected lymph nodes resulted in isolation of C. ovis from 6 lymph nodes out of eight nodes (75%) (Table 1). Other isolates as Strept. spp. 37.7%, Staph. 42.3% and Coryne pyogenes 20%.

Coryne ovis was not isolated from faeces, surface soil, nostrils, surface skin of apparently normal animals. It was only isolated from lymph node of those showing enlargement or swelling.

II- Slaughtered sheep:

One enlarged preascapular, parotid and 2 submaxillary lymph nodes were detected before slaughter out of 33 cases examined (Table 2). Coryne ovis was isolated from one enlarged parotid lymph node as well as from one of the two lungs which showed lesions.

III- Experimental Infection:

Subcutaneous and intradermal inoculation resulted in isolation of C. ovis only from inoculation site while it was not isolated from neither scarification site nor the adjacent lymph nodes which showed no abnormality. Intranasal inoculation resulted in isolation of C. ovis from the lungs of one case only. Oral dosing with smaller dose gave negative results while the bigger oral dose (50 ml) resulted in isolation of C. ovis from enlarged mesentric lymph nodes but neither from faeces nor from intestine.

Intravenous inoculation resulted in abscess formation in spleen, lungs, liver and bronchial lymph nodes. This animal showed progressive emaciation.

DISCUSSION

The clinical examination of 3822 sheep in this study revealed percentage of 4.3% of affected animals. Several authors reported that the main way of infection is through cutaneous wounds as a result of shearing process (SIGMAI, 1973 and JENSEN, 1974). However, in the present study it was observed that sucking lambs of 3 months old were also found infected and C. ovis was isolated from lambs (20%) which have never been shorn before. Such observation was in agreement with that reported by HADDY (1953).


The results of antem and postmortem examination of slaughtered sheep showed that apparently normal sheep may harbour the micro-organism as cultrues made from lymph nodes and organs of 24 males and 9 females slaughtered sheep resulted in isolation of C.ovi from one lung and one parotid lymph node of male animal, while that of females did not reveal the presence of the organism. It seems that incidence of C.ovi infection should not depend only upon clinical examination of sheep as such infection may be overlooked during clinical examination. However, there are no reliable method of diagnosis of latent infection (AWAD, 1960, ZAKI, 1968; SHIGIDIL, 1979 and BARAKAT, ET AL, 1979). In Cairo abattoir reported NADIM (1966) a percentage of 2.22% infected cases.

During examination of lymph nodes of slaughtered sheep, some of them were enlarged and contained pus which did not reveal C.ovi isolation. This may be due to presence of old lesions and the organisms in this case may be in declined phase. Similar interpretations were also discussed by WILSON and MILES (1976).

LOTFI ET AL, (1977) isolated Pasteurella multocida from lesions simulating caseous lymphadenitis in sheep. These observations were in agreement with our findings where Staphylococci were isolated from slaughtered sheep. Streptococci, Coryne pyogenes were also isolated from lymph nodes of clinically infected sheep.

Laboratory examination of various lymph nodes of sheep revealed that parotid lymph node showed highest percentage of infection, however, NADIM ET AL, (1966) found that bronchial and mediastinal lymph nodes showed the highest percentage of C.ovi infection from cases of slaughtered sheep.

Experimental infection in the present study was carried out by different methods. In scarification area, adjacent to right submaxillary lymph node, 200 days later the organism was not recovered from both scarified area or adjacent lymph node. Absence of infection by this route may consider the role of shearing as a way of infection is doubtful.

Experimental intradermal inoculation resulted in isolation of C.ovi only from site of inoculation where it caused a local suppurrative focus. CARNE (1946) mentioned that natural infection caused initial suppuration of skin. This is in agreement with our results of experimental infection.

Nasal infection of sheep may cause a typical form of caseous lymphadenitis. RELOMBRE (1954) reported that bronchopneumonia in a flock of sheep from which the same organism was isolated. In the present study, intranasal infection in 2 sheep resulted in isolation of C.ovi from lungs of one animal, the other animal showed lung lesions with absence of the organism. In our country Inhalation of dust may constitute a principle way of infection. However, failure of isolation of the organism from nostrils of both clinically normal and infected sheep dwellings was observed.

Oral experimental infection was not succeeded in this study as it may be attributed to the lowered virulence of the organisms in the inoculum was below the potential number needed to initiate infection. However, isolation of C.ovi from faeces of both healthy and infected sheep was reported by SELCHSER (1954).

In the second experimental oral infection where a bigger dose of C.ovi culture (50 ml) as given orally, the possibility of intestinal infection was greater than small dose as the isolation of organism from mesenteric lymph nodes occurred 200 days post infection. SELCHSER (1959) suggested that oral infection might be introduced through abrasions of the lips and gums or injury to intestinal wall.

The intravenous inoculation of sheep with a small dose (1 ml) resulted in abscess formation in paranchymatous organs as spleen, liver and lungs.

It appears that C.ovi might have a bacteremic phase in which the organisms are disseminated to paranchymatous organs where they colonize and set up infection beginning with organs rich in lymphoid tissue since C.ovi has a lymphoid affinity. However, CAMERON (1972) reported that C.ovi culture in doses of 2x10^{-7}10 seldos caused lesions where doses of 10^{-9}10 resulted in death of some animals within 3 days.

In the respect with infection of parotid lymph node, it is assumed that way of natural infection in upper Egypt is through ingestion as these nodes situated away from shearing areas. Furthermore, very important character of the disease is that infected sheep are deprived from their immunity system as lymph nodes are converted to abscesses. The outcome is not only depently but also lowered immune response to vaccines.

REFERENCES


<table>
<thead>
<tr>
<th>Date</th>
<th>Code</th>
<th>Description</th>
<th>Quantity</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>3</td>
<td>Item A</td>
<td>10</td>
<td>units</td>
</tr>
<tr>
<td>9</td>
<td>2</td>
<td>Item B</td>
<td>20</td>
<td>units</td>
</tr>
<tr>
<td>12</td>
<td>1</td>
<td>Item C</td>
<td>30</td>
<td>units</td>
</tr>
<tr>
<td>15</td>
<td>4</td>
<td>Item D</td>
<td>40</td>
<td>units</td>
</tr>
</tbody>
</table>

**Total:**
- Item A: 100 units
- Item B: 200 units
- Item C: 300 units
- Item D: 400 units
### TABLE (2)

Isolation of *C. ovis* from Lymph Nodes Clinically Normal Slaughtered Sheep.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>L</td>
<td>R</td>
<td>L</td>
</tr>
<tr>
<td>Males</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
<td>24</td>
</tr>
<tr>
<td></td>
<td>(Number 24)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><em>C. ovis</em> isol.</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>1</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>--</td>
</tr>
<tr>
<td>Females</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>(Number 9)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>33</td>
<td>24</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>(Number 33)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>


: Staphylococci were isolated.
<table>
<thead>
<tr>
<th>Step</th>
<th>Description</th>
<th>Duration</th>
<th>Action</th>
<th>Impact</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>No. Information</td>
<td>1 day</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>2</td>
<td>2. Receive Initial Notice</td>
<td>2 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>3</td>
<td>3. Receive Notice of Hearing</td>
<td>3 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>4</td>
<td>4. Notice of Hearing</td>
<td>4 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>5</td>
<td>5. Notice of Hearing</td>
<td>5 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>6</td>
<td>6. Notice of Hearing</td>
<td>6 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>7</td>
<td>7. Notice of Hearing</td>
<td>7 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>8</td>
<td>8. Notice of Hearing</td>
<td>8 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>9</td>
<td>9. Notice of Hearing</td>
<td>9 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>10</td>
<td>10. Notice of Hearing</td>
<td>10 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>11</td>
<td>11. Notice of Hearing</td>
<td>11 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
<tr>
<td>12</td>
<td>12. Notice of Hearing</td>
<td>12 days</td>
<td>Insert into Departmental Notice</td>
<td>None</td>
</tr>
</tbody>
</table>

**Semi-Annual Budget: Departmental Notice Period:**

- **Month:**
  - January
  - February
  - March
  - April
  - May
  - June
  - July
  - August
  - September
  - October
  - November
  - December

- **Duration:**
  - 1 month
  - 2 months
  - 3 months
  - 4 months
  - 5 months
  - 6 months
  - 7 months
  - 8 months
  - 9 months
  - 10 months
  - 11 months
  - 12 months

- **Impact:**
  - None