

## Clinico-pathological observations on naturally occurring contagious ecthyma in lambs in Saudi Arabia

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Typical lesions of contagious ecthyma were diagnosed in lambs four months old and infection has been confirmed by viral isolation and identification. The lambs had lower total serum protein values, haemoglobin concentration, erythrocyte counts and packed cell volume, but higher blood leukocyte counts and increased serum transaminase activity when compared to apparently healthy animals. The disease is believed to be transmitted from newly introduced goats which showed evidence of infection.

**Key words :** Sheep - Lamb - Contagious ecthyma virus - Serology - Saudi Arabia.

### Introduction

Contagious ecthyma (CE) is a zoonotic viral disease of sheep and goats with world-wide distribution (7). The clinical disease is known to exist in Saudi Arabia but the virus has only been recently identified for the first time from natural outbreaks in sheep and goats (2). The lesions are mainly observed in the lips, nares and oral mucosa, though other sites may be involved (1, 7). The oral lesions may be associated with feeding difficulties, loss of condition and changes in blood values. In the following observation some clinico-pathological features of naturally occurring CE in lambs are presented.

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### Material and Methods

In February 1992 a four-month-old lamb from King Faisal University Farm, Al-Ahsa, Saudi Arabia, was presented for post-mortem examination. Typical lesions of CE were observed in the lips and oral mucosa. The farm was visited and the flock of lambs was carefully examined (84 lambs, 4 months old). The lambs were kept in two separate pens holding equal numbers of animals and were fed on hay supplemented with barley grains; water was provided *ad libitum*. They were vaccinated against clostridial diseases and haemorrhagic septicemia at about two months of age and dipped for ectoparasites 15 days later. The dams were vaccinated against sheep pox and dipped at midterm of gestation. Biopsy and scab materials were collected from animals showing lesions.

Jugular blood was drawn from ten lambs exhibiting visible mouth lesions suggestive of CE and from another ten apparently healthy ones with no lesions for haematological and serum biochemical analysis; the lambs belonged to the Dorper breed. Haemograms were done using conventional standard methods (4) and serum analysis was carried out with the aid of an analyser\*.

The biopsy samples were fixed in 10 % formalin, processed in paraffin and sections 4-6  $\mu$  thick were prepared and stained with haematoxylin and eosin (H&E).

Scabs were ground to produce a 50 % suspension in sterile Minimum Essential Medium (MEM), pH 7.4. A portion of this suspension was kept at  $-70^{\circ}\text{C}$  for the agar gel immunodiffusion test (AGID) and the rest was clarified and treated with antibiotics (8) for virus isolation on primary goat kid kidney (PGKK) cell culture and vero cells. The isolated virus was titrated in PGKK (6). The serum neutralization test (SNT) (11) and the AGID test (10) were used to identify the cell-culture-isolated virus and the virus in the original scab material, respectively, using standard specific rabbit anti orf hyperimmune serum (2).

### Results

At clinical examination 23 lambs were found to have coalescing nodular scabby lesions in the lips and ulcerating nodules in the gums and inner lip. They appeared dull with drooping heads and were reluctant to feed. The lambs with lesions were restricted to one pen neighbouring a pen holding goats introduced from the Western Region in January 1992. Some of the goats showed whitish shiny scars in their lips.

The medians and ranges of the haematological values for lambs with and without CE lesions were respectively as follows: haemoglobin (Hb): 9.2 (7.5-10.7), 11.0 (9.4-13) g/dl; erythrocyte counts (RBC): 3.7 (3.0-5.3), 5.0 (3.9-6.5)  $\times 10^{12}/\text{l}$ ; packed cell volume (PCV): 0.31 (0.25-0.35), 0.34 (0.27-0.39) l/l; total blood leukocytes (WBC): 9.3 (3.1-16.7), 7.1 (2.9-10.6)  $\times 10^9/\text{l}$ ; neutrophils: 5.2 (1.7-10.2), 4.2 (1.4-5.8)  $\times 10^9/\text{l}$ ; lymphocytes: 3.4 (1.2-



## Communication

5.7),  $2.6 (0.9-4.8) \times 10^9/l$ ; monocytes :  $0.48 (0.16-1.01)$ ,  $0.3 (0.08-0.56) \times 10^9/l$ ; eosinophils :  $0.05 (0-0.28)$ ,  $0.01 (0-0.15) \times 10^9/l$ . The corresponding values for serum constituents were : total proteins (TP) :  $53 (48-62)$ ,  $64 (51-85)$  g/l ; serum iron (Fe) :  $14.7 (9.8-20)$ ,  $16.5 (9.7-25)$   $\mu\text{mol/l}$  ; aspartate aminotransferase (ASAT) :  $61 (32-80)$ ,  $33 (18-63)$  IU/l ; alanine aminotransferase (ALAT) :  $50 (30-64)$ ,  $27 (12-54)$  IU/l. Non-parametric one-way analysis using SAS software revealed significant differences in the values of RBC, PCV, Hb, TP, ASAT and ALAT.

Histopathological examination of the biopsy specimens revealed the presence of acanthosis and spongiosis in the epidermis associated, in places, with ulceration and formation of multilayers of necrotic debris containing neutrophils and downward growth of basal cells. The dermis was heavily infiltrated with polymorphs and occasionally the boundary with the epidermis was obscured with inflammatory cells (fig. 1, 2).

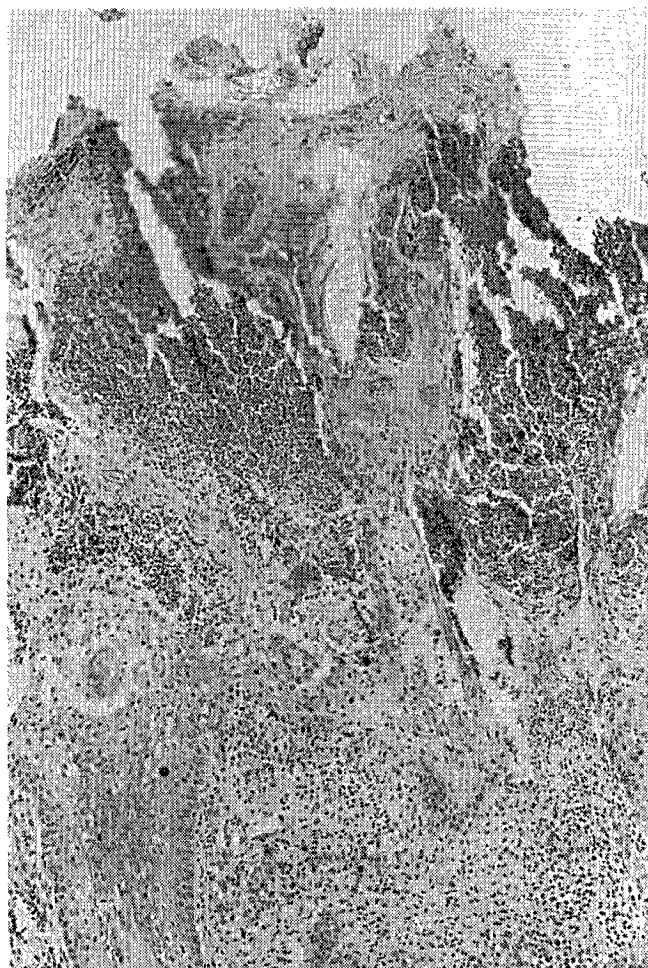


Figure 1 : Necrosis of epidermis with intense infiltration of neutrophils. H&E  $\times 70$ .

Inoculation of the scab virus homogenate onto both cell culture systems employed produced a cytopathic effect. The virus titre at passage three in PGKK cell culture was  $10^{5.8}$  TCID<sub>50</sub>/ml. A complete precipitation line of identity was formed by the scab virus homogenate and the cell culture concentrated virus isolate against the orf anti-serum in the AGID test. The isolated virus was completely neutralized by the orf hyperimmune serum.

## Discussion

The gross and histopathological picture of the oral lesions are typical of CE infection, which has been confirmed by virus identification using standard specific anti orf hyperimmune serum (3, 7). The decreased values of TP, Fe, RBC, Hb and PCV in lambs showing CE lesions suggest the occurrence of anaemia. This could result from the inappetence and feeding difficulties associated with the

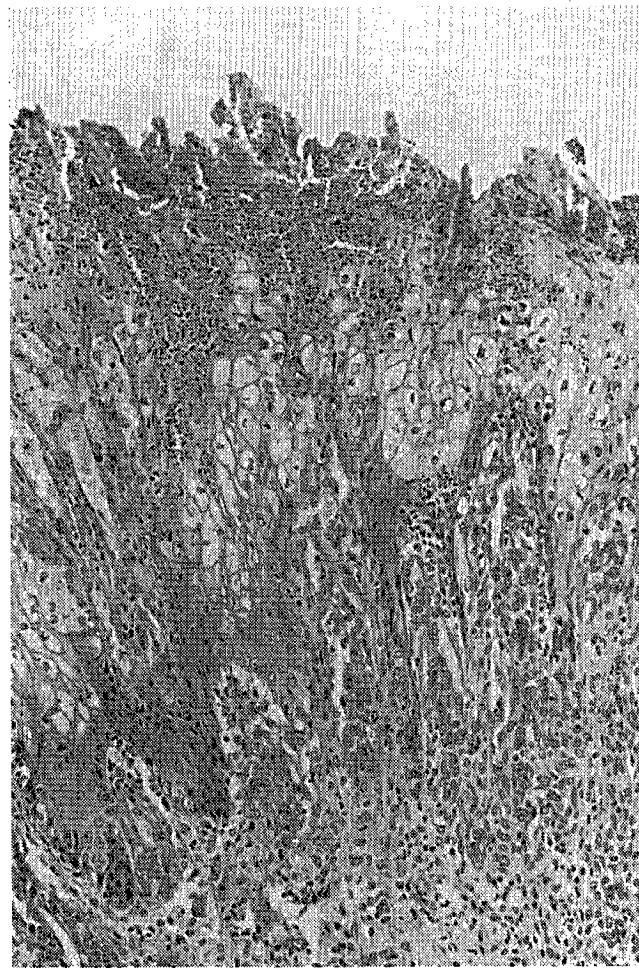


Figure 2 : Epidermis showing acanthosis, spongiosis and downward growth of basal cells. H&E  $\times 135$ .

oral lesions which constitute a major cause of production losses in infected lambs (2, 5, 7). The peripheral leukocytosis observed was due to an increase in all cell fractions, particularly neutrophils and lymphocytes. The increase in lymphocytes and monocytes could be expected in viral infections, while that in neutrophils may be a response to secondary bacterial complications. The increased activities of the serum transaminases may be attributed to tissue damage caused primarily by CE and probably to other secondary lesions in internal organs (1, 7).

Information on the haematological and serum biochemical changes in CE infection appears to be scanty. The present findings are preliminary observations. Conclusive information can be obtained in future studies by comparing different groups of sick animals with healthy ones or through controlled experimental infections.

## Conclusion

This is the first incident of CE in King Faisal University Farm. The source of infection is believed to be the newly introduced goats, which showed evidence of infection, as only the lambs neighbouring the goats were affected. The caprine CE virus can elicit lesions in ovines and vice versa (3, 9). In this respect, the viruses isolated from sheep and goats with the natural disease in Saudi Arabia have been found to be serologically identical (2).

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- GAMEEL (A.A.), ABU ELZEIN (E.M.E.), HOUSAWI (F.M.T.), AGIB (A.), IBRAHIM (A.O.)**. Observations clinico-pathologiques de l'ecthyma contagieux chez des agneaux infectés naturellement en Arabie Saoudite. *Revue Elev. Méd. vét. Pays trop.*, 1995, **48** (3) : 233-235.
- Des lésions caractéristiques de l'ecthyma contagieux ont été constatées chez des agneaux âgés de quatre mois. L'infection a été confirmée par isolement et identification du virus. Chez les agneaux, on observe des taux de protéines sériques totales, des concentrations en hémoglobine, un dénombrement d'érythrocytes et un hémocrite plus faibles ; par contre, on note des taux de leucocytes sanguins et de transaminases sériques plus élevés lorsqu'on les compare avec les animaux apparemment en bonne santé. On pense que la maladie est transmise à partir de chèvres infectées nouvellement introduites.
- Mots-clés** : Ovin - Agneau - Virus ecthyma contagieux - Sérologie - Arabie Saoudite.