

EPIDEMIOLOGICAL, CLINICAL AND HISTOPATHOLOGICAL STUDIES OF LAMB AND KID POX IN DUHOK, IRAQ

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Summary

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Retrospective quantitative analysis of epidemiological data of sheep and goat pox from the Duhok area revealed important scientific information. In the state, 308 lambs and kids from two flocks were affected by pox outbreaks and the disease was reported during the winter season. The study clearly showed that disease incidence was the highest in December and the percentage of affected animals was 30% in lambs, 40% in kids. Clinically severe systemic reaction characterised by nasal discharge accompanied by intense coughing, dyspnea, conjunctivitis and lacrimal discharge were observed. Gross and histopathological findings showed presence of pox lesions in different stages especially in areas with less wool and hair with clearly changes in the epidermis and the dermis of the skin layers. This study characterised the sheep and goat pox according to epidemiological, clinical and pathological events in Duhok area of Iraq.

Key words: kids, lambs, pathology, pox

INTRODUCTION

Sheep pox and goat pox (SGPX) are contagious viral systemic diseases characterised predominantly by skin and internal lesions which were regarded as different diseases in the past (Bhanuprakash *et al.*, 2005). The virus that causes SGPX is a capripoxvirus from the family Poxviridae, one of the largest (170–260 nm by 300–450 nm) enveloped, double stranded DNA viruses (Matthews, 1982). The pathogenicity of disease in farm animals depends on many factors (Davies, 1976; Singh, 1979; Kitching & Taylor, 1985a,b). The disease is endemic in most parts of the world such as Africa north of the Equator, the Middle East, Turkey, Iran, Iraq, Afghanistan, Pakistan, India, Nepal and other parts of the world (Hussein *et*

al., 1989; Office International des Epizooties, 2008; Zewdie, 2009).

In Iraq, the virus was isolated for the first time from the northern part of Iraq and designated as Sersenik strain (Tantawi & Al-Falluji, 1979; Al-Bana & Abass, 1983). Morbidity and mortality vary with the breed of the animal, its immunity to capripox viruses, and the viral strain. Under field conditions, the incubation of SGPX is between 4 and 8 days (House, 1992). Pox infections can limit trade, export, and development of intensive livestock production. They also interfere with the import of new breeds because the mortality attains up to 50% in a fully susceptible flock and could be as high as 100% in young animals (Bhanuprakash *et al.*, 2005).

Histopathology of the affected skin includes an initial epithelial hyperplasia, histiocyte accumulation in the affected areas, necrosis and hydropic degeneration with formation of many vesicles of various size. Infected epithelial cells and histiocytes showed intracytoplasmic inclusion bodies (Chanie, 2011).

Generally, SGPX is a disease of considerable economic importance for Iraqi animal farming. However, little information is available regarding the disease in the Duhok region of Iraq. Therefore, the present study aimed to analyse the epidemiological, clinical and histopathological findings of SGPX in indigenous animals in Duhok area of Iraq.

MATERIALS AND METHODS

Flock history

This study was conducted in different district areas of Duhok from October 2011 to June 2012. Skin lesions on different areas of the face, ears, around the mouth, udder, tail and scrotum with severe systemic reaction were investigated in 308 young animals (196 lambs, 112 kids) from two flocks. All animals were clinically examined in the

field. During the current year the animals were not vaccinated, but before, these flocks were annually vaccinated against SGPX.

Clinical and pathological examinations

Complete clinical examination was performed on the affected flocks. Specimens from the edge of the lesions from different parts (head, ears, face and lips, tail and skin) were taken by scalpel and sent to the Department of Pathology and Microbiology, Faculty of Veterinary Medicine, Duhok for pathological study.

The post mortem lesions were recorded from dead animals. Specimens from the lesions were collected and fixed in 10% neutral buffered formalin for routine histopathology, after haematoxylin-eosin (H&E) staining.

RESULTS

Epidemiological data

The present study showed that young lambs and kids 2–4 months of ages suffered from lesions of pox. Out of 196 lambs, 60 lambs had clinical signs (morbidity 30%) and 13 lambs were found dead (mortality rate 6.7%) (Tables 1 and

Table 1. Epidemiological data of affected lambs during the period of study

| Months | Number of examined lambs | Morbidity rate | Mortality rate |
|-----------|--------------------------|----------------|----------------|
| September | 22 | 6 | 1 |
| October | 10 | 2 | – |
| December | 60 | 25 | 7 |
| January | 22 | 9 | 2 |
| February | 21 | 10 | 3 |
| March | 11 | 2 | – |
| April | 20 | 2 | – |
| May | 20 | 1 | – |
| June | 10 | 2 | – |
| Total | 196 | 60 | 13 |

Table 2. Epidemiological data of affected kids during the period of study

| Months | Number of examined kids | Morbidity rate | Mortality ate |
|-----------|-------------------------|----------------|---------------|
| September | 18 | 2 | 1 |
| October | 10 | 3 | 1 |
| December | 30 | 20 | 14 |
| January | 12 | 10 | 5 |
| February | 12 | 4 | 2 |
| March | 8 | 1 | – |
| April | 9 | 1 | – |
| May | 8 | 2 | 1 |
| June | 5 | 1 | – |
| Total | 112 | 44 | 24 |



Fig. 1. Erythematous (macules) and papular lesions appearing under the tail.



Fig. 2. Pustular changes with ulceration in the mouth and eyelids.

2). Out of 112 kids, 44 kids were with clinical signs (morbidity rate 40%) and 24 died (mortality rate 22%). Analysis of epidemiological data on sheep and goat pox from the different Duhok regions showed disease occurrence during the winter and clearly showed that the incidence was the highest during Decem-

ber and in the dry agroclimatic zones. The infection rates were high at younger age. Results did not show any variation in disease susceptibility related to the sex.

Clinical observation

The clinically sick animals showed increased body temperature for four to

five days. During the disease period, all infected animals were found depressed. Also, there was a severe systemic reaction characterised by nasal discharge accompanied by intense coughing; dyspnea, conjunctivitis and lacrimal discharge. During the inspection and palpation, skin lesions characterised by 2–3 cm areas of hyperaemia and multiple cutaneous nodules which were distributed widely over the body, particularly in the groin, axial parts, under the tail and in the face, ear and lips were detected (Fig. 1). These macules may on some areas develop to papules without vesicles which in some animals formed scabs and scars tissues (Fig. 2).

Gross lesions

At postmortem examination, the main organ examined was the skin. Many of macules found on the skin appeared like papules, the center became depressed and gray (necrotic) and scabs covered the lesions, surrounded by small areas of haemorrhages and congestion. In some cases with severe systemic reaction, the lungs were found congested, oedematous, and containing few whitish to red coloured areas. Lymph nodes throughout the body were founded inflamed, enlarged and oedematous.

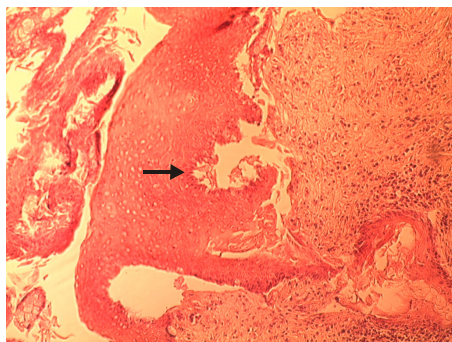


Fig. 3. Histopathological changes of pox lesions show acanthosis and parakeratosis of epidermal layers of skin (arrow). H&E, 4 \times .

Histopathological lesions

Histopathological study revealed epidermal and dermal changes of skin layers – acanthosis, parakeratosis and hyperkeratosis with degeneration of proliferating epithelial cells (Fig. 3). The dermis showed vesicles of various size filled with pink fluid, oedema, vasculitis, infiltration of inflammatory cells such as macrophages, fibroblasts and histiocytes (Fig. 4).

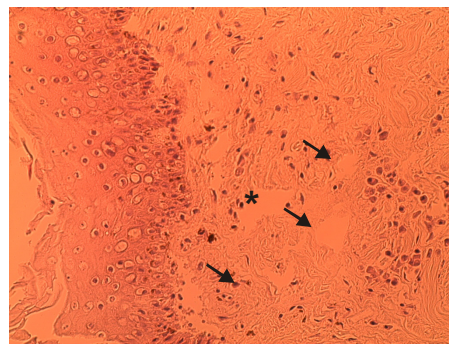


Fig. 4. Histopathological changes of pox lesions showing vesicles of various size filled with pink fluid (asterisk), and infiltration of inflammatory cells such as macrophages, fibroblasts and histiocytes (arrows). H&E, 10 \times .

Initial epithelial hyperplasia was followed by coagulation necrosis as thrombi developed in the blood vessels supplying some papular lesions (Fig. 5). The infected epithelial cells and histiocytes showed intracytoplasmic inclusion bodies, which stained from eosinophilic to light blue (Fig. 6).

DISCUSSION

SGPX is considered as one of the important contagious viral diseases, which are highly endemic and found in the area of study, thus posing a serious problem. This is not only because it is found widely

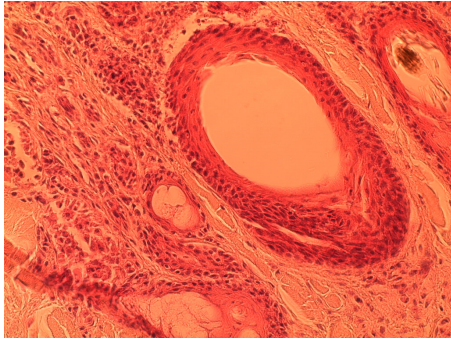


Fig. 5. Initial epithelial hyperplasia followed by severe infiltration of inflammatory cells and necrosis as thrombi developed in the blood vessels supplying the papules. H&E, 10 \times .

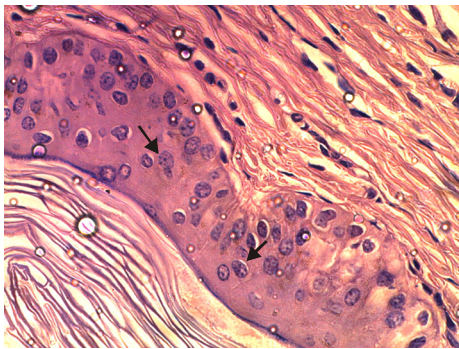


Fig. 6. Intracytoplasmic inclusion bodies (arrows) of the keratinocytes of skin epidermis, H&E, 40 \times .

distributed besides other viral disease which cause death of kids and lambs, but it is species specific and affects animals of both sexes and all ages. This probably contributes to the widespread occurrence of SGPX infections in this area as in enzootic areas, the disease prevalence is related to traditional forms of husbandry (Kitching, 1994; Sheikh *et al.*, 2004).

The survey made in this study showed that many of the respondents were aware with the clinical signs and an effect of

SGPX and recorded prevalence was lower than that in other reports. This may be because the present study included only animals presented for examination of SGPX but not such with other complicated disease with clinical signs identical to the malignant form of pox disease (Rao & Bandyopadhyay, 2000; Senthilkumar *et al.*, 2006).

SGPX has been recorded in Iraq, Africa, The Middle East, Turkey, India, Iran and most other parts of the world. Poor conditioned animals, overcrowding, poor feeding, and general mismanagement and abnormal uses of vaccination appeared to be the main cause of distribution and susceptibility to infection with the pox virus, which was observed in the presents study and was in agreement with others reserachers (Hussein *et al.*, 1989; Sheikh *et al.*, 2004).

The gross and histopathological findings in this study were similar to those reported which included dermal and epidermal changes, acanthosis, parakeratosis and hyperkeratosis, mild hyperplasia, massive cellular infiltration of inflammatory cells macrophages, histocytes and occasionally eosinophils, lymphocytes and plasma cells, and vasculitis (OIE, 2008).

The clinical and histopathology findings of the present study and epidemiological data indicated that sheep and goat pox infection in the surveyed area was endemic and therefore, necessitating further experimental and isolation studies in the future.

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