

**RINDERPEST IN CATTLE IN MOSUL AREA:  
CLINICAL OBSERVATIONS AND SEROLOGICAL  
DIAGNOSIS**

Y.A.Yousif, M.I. Sawa and M.M. Zenad,  
College of Veterinary Medicine,  
University of Mosul, Mosul, Iraq.

**SUMMARY**

Outbreaks of rinderpest in cattle occurred in Mosul area between February to June 1987. The morbidity and mortality rates were 45.9% and 19.3%, respectively. The disease was characterized by pyrexia, nasal discharge, lacrimation, hyperemic mucous membranes, anorexia, diarrhoea, lesions in the buccal cavity, respiratory distress and reduced rumen motility. Haematological studies revealed leukopenia and concurrent infection with theileriosis and anaplasmosis in 26.6% of RP affected cattle. Rinderpest viral antigens were detected in mesentric and visceral lymphnodes and spleen of the affected animals by agar gel diffusion test.

**INTRODUCTION**

Rinderpest (RP) or cattle plague is an acute, subacute or inapparent febrile contagious disease of ruminants, primarily of cattle and buffaloes (1). The disease is characterized by severe hemorrhagic catarrh of mucous membranes with necrotic lesions in the mouth and gastrointestinal tract (2).

Rinderpest virus has been first isolated in Iraq from the calves during an outbreak of the disease in Baghdad (1). Rinderpest has been reported from Saudia Arabia, Kuwait, Lebanon, Syria and Iran after gaining its entrance in



1969 to Middle East countries due to the import of slaughtered livestock from Africa and other Asian countries. The disease appeared again in 1979 due to importation of animal products from Africa, India and other Asian countries in Lebanon, Saudia Arabia, Iran, Syria, Palestine and Arabian Gulf. In 1982 , the disease reappeared in Lebanon, Syria, Saudia Arbia, Iran and Palestine, Iraq was free from RP till March 1985 (3).

The present study presents the clinical features, haematological changes and agar gel diffusion test for the diagnosis of RP in cattle during an outbreak in 1987 in Ninevah province of Iraq.

## MATERIALS AND METHODS

The study comprised five outbreaks in the feedlot cattle in the age group of 11 to 16 months occurring between February to june, 1987 in Mosul area of Ninevah province. Clinical manifestations consisted of loss of appetite , high rectal temperature, diarrhoea, nasal discharge, lesions in the buccal cavity, enlargement of the superficial lymphnodes, respiratory distress, rumen motility and lacrimation in the affected animals.

Haematological examinations included white blood cells and red blood cells counts, haemoglobin concentration and packed cell volume determined in 20 affected and 10 normal animals following the methods of Schalm et al. (4). Screening of blood parasites was also done after staining blood films with giemsa stain. Agar gel diffusion test as discussed below was applied on 12 affected animals.

### A. Preparation of gel

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Two concentrations of high quality agarose (Behring Institute) were used in phosphate buffer saline, 1% was used first to precoat the surface of the slides and layered with 1.5% moltan agar to give a layer of approximately 3 mm depth.

A pattern of lateral five wells formed around central well were stamped in the agar gel by means of plastic



pattern and metal tube cutter. Each well 5 mm in diameter and 5 mm apart from the central well (5).

#### B. Preparation of sample

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Mesentric and visceral lymphnodes and spleen were collected from 12 rinderpest suspected animals during the early stages of the disease. Each sample was homogenized with sterile sand and phosphate buffer saline to give a final concentration of 25%. The homogenate was centrifuged at 4°C at 3000 rpm for 15 minutes. The supernatant fluid was collected and used for the detection of RP viral antigen.

#### C. Precipitation test

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Fifty microliter from each clarified supernatant fluid was placed in one of the lateral wells and the upper and lower wells were filled with positive hyperimmune serum produced locally and negative controls serum from non vaccinated cow respectively. RP immune serum was added to the central well. Slides were then incubated in humid incubator at 37°C for 18-24 hrs.

### RESULTS

#### Clinical observations

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Out of a population of 435 animals, 200 were affected with the disease revealing a morbidity of 45.9%, 83 animals died presenting a mortality rate of 19.3% (Table 1). Affected animals showed clinical manifestations of the disease.

The classical clinical picture in the early stage was characterized by a rapid onset of fever (40°C). The affected animals were depressed, restless and anorexic. Muzzle was at first dry and later moistened with serous nasal discharge. The nasal discharge became profuse and mucopurulent at a later stage.

Nasal discharge and lacrimation were observed on 81.2% and 92.3% animals respectively (Table 2). Diarrhoea was



seen in 87.2% animals. Hyperaemic mucous membranes were visible in 87.8% cases. During the initial stage of the disease, rumination was depressed and 37.6% of affected animals exhibited blood stained faeces. The rumen motility was reduced to 2 per 5 minutes (Table 2).

Table 1: Morbidity and mortality rate in natural rinderpest infection in cattle in Mosul outbreaks.

Total animal population	Number of affected animals	Morbidity %	Number of death	Mortality %
435	200	45.9	83	19.3

Table 2: Showing important clinical manifestations of rinderpest in cattle in Mosul outbreaks.

Clinical manifestation	Percentage
Lacrimation	92.3
Diarrhoea	87.2
Blood stained faeces	37.6
Anorexia	81.2
Fever	70.1
Hyperaemia of mm	87.8
Nasal discharge	81.2
Lesions on buccal cavity	87.2
Lesions on muzzle and perineum	6.8
Respiratory distress	87.2
Abnormal sounds in lungs	35.9
Enlargement of superficial L.N.	37.6
Dehydration	35.9
Reduced rumen motility	70.1



External signs became increasingly severe. Respiratory rate was rapid and shallow and of abdominal type and in terminal stage became laboured and accompanied by expiratory grunt. Respiratory distress was observed in 87.2% animals.

Small necrotic areas and erosions on the mucosal membranes of buccal cavity were observed in 87.2% animals. These lesions were small, nearly 2 mm in diameter, greyish areas of necrotic epithelium surrounded by a zone of hyperaemia affecting the lower lip and gums. There was also excessive salivation. The affected animals later on became extremely dehydrated due to large volume of watery faeces voided.

#### Haematological findings

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Haematological findings revealed leukopenia in 76.9% animals. Haemoglobin and red blood cell counts were within the normal range (10 gm % and 7.6 million /cu.mm respectively).

There was no any appreciable change in the level of PCV in RP affected animals when compared with those of normals (Table 3). Concurrent infection of theileriosis and anaplasmosis was recorded in 26.6% cases. Babesiosis not seen in any animal.

#### Agar gel diffusion

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Gel diffusion revealed a clear line of precipitation between the central well containing RP immune serum and the top well containing positive control antigen. No precipitation line was detected with negative control. All twelve samples collected from the RP affected animals (lymphnodes and spleen) showed a clear line of precipitation. However, lines of precipitation formed by mesentric lymphnodes were more clear than those of visceral lymphnodes and spleen. The lateral lines were linked with upper positive control RP antigens indicating identity.



Table 3: Showing haematological values in normal and RP affected cattle.

Parameters	Mean $\pm$ S.D	
	Normal	RP
Red blood cells ( $\times 10^6/1$ )	6.29 $\pm$ 1.25	7.62 $\pm$ 1.11
Haemoglobin (gm/dl)	8.76 $\pm$ 1.35	9.98 $\pm$ 1.59
Packed cell volume (%)	30.6 $\pm$ 3.45	32.0 $\pm$ 2.76
White blood cells ( $\times 10^3/1$ )	9.14 $\pm$ 2.27	6.06 $\pm$ 0.81

### DISCUSSION

RP outbreaks occurred in cattle during February and June 1987 in Mosul area of Ninevah province. Similar outbreaks first reported in cattle and buffaloes in Baghdad between April and June 1985 with mortality rate of 38.4% and 7.3% in two villages (1). In the present study 19.3% mortality and 45.9% morbidity was observed. Clinical manifestations comprising of increased rectal temperature, nasal discharge, diarrhoea and sometimes mixed with blood were similar to the observation made by Al-Bana et al. (1). Clinical observations as reported by Narayanaswamy et al. (6) comprised of fever, mouth lesions and diarrhoea in 87.5% adult cattle and 34.5% incalves. 52% animals had fever and mouth lesions and 10.3% fever and diarrhoea only. They further observed a mortality rate of 51.78% in adult cattle and 52.86% in calves indicating almost a uniform pattern.

Bansal (2) has reported sudden onset of the disease with a sharp rise of body temperature, dry muzzle, impaired appetite and restlessness in frank clinical cases of RP. He has further observed dropping of body temperature at the onset of diarrhoea. Respiratory distress and dehydration as observed in the present study have been reported by Bansal (2).

Reid (7) noticed respiratory signs, nasal discharge, hyperaemic mucous membranes and excessive lacrimation of animals affected with RP.



Dhir et al. (8) have reported a decrease in the level of haemoglobin in case of RP which did not agree with our findings as we found no change in haemoglobin value ( $p > 0.05$ ) between normal and RP affected cattle.

Concurrent infection of theileriosis and anaplasmosis was noticed in 26.6% animals. Scott et al. (9) have also reported that virus of RP causes a decrease in number of both T and B lymphocytes and activates latent infection of blood parasites and might create difficulty in the diagnosis of subacute form of RP infection.

The application of the different lymphoid tissues from diseased animals for agar gel diffusion test were positive since RP affected animals have a number of precipitating antigens as reported by Bansal (2), which can be demonstrated by agar gel diffusion test (10).

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الطاعون البقري في المواشي في منطقة الموصل  
ملاحظات سريرية والتشخيص المصلي

يوسف ابلحد يوسف ، مؤيد ابراهيم ساوا ، محمد مشجل زناد  
كلية الطب البيطري، جامعة الموصل ، الموصل -العراق

## الخلاصة

حدثت ثورات مرضية للطاعون البقري في المواشي في منطقة الموصل للفترة من شباط -حزيران ١٩٨٧ . معدلات الإصابة والهلاك كان ٤٥٩% و ١٩٣% على التوالي . المرض تميز بالحمى ، افرازات انفية ، تدمع العين، احتقان الاغشية المخاطية القهم ، الاسهال ، آفات نخرية في تجويف الفم ، اضطرابات تنفسية وضعف في حركة الكرش.

دراسة الصورة الدموية للحيوانات المريضة أظهرت نقص في عدد كريات الدم البيضاء (leukopenia) ، وتزامن الخمج بالثليريا (Theileriosis) والانبلازما (anaplasmosis) مع الإصابة بالطاعون البقري وبنسبة ٢٦٦% من الحيوانات المصابة بالطاعون البقري. وقد تم الكشف عن مستضدات حمات الطاعون البقري بواسطة اختبار الانتشار المناعي في هلامه الاكار (test agar gel diffusion) في العقد للمفاوية المساريقية والاحشائية والطحال.