

Evidence of peste des petits ruminants virus (PPRV) infection in Sindh Ibex (*Capra aegagrus blythi*) in Pakistan as confirmed by detection of antigen and antibody

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Accepted: 27 December 2010 / Published online: 9 January 2011
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Abstract An outbreak resulting in mortality in Sindh Ibex (*Capra aegagrus blythi*) was investigated. There was a history of about 36 deaths (both young and adult) during the period of 1 month. Disease appeared in a generalized form, affecting the respiratory and digestive systems. Major lesions were respiratory distress, pustules on and in the mouth, ocular–nasal discharges, and severe diarrhea. The most significant lesion was the oculonasal discharges and diarrhea. Deaths were mainly due to blindness, anorexia, diarrhea, and respiratory arrest. Both adult (mortality=21) and young (mortality=15) animals were affected with the disease. Peste des petits ruminants virus (PPRV) antigen was detected in the spleen, lung, lymph node, and swab samples by immunocapture enzyme-linked immunosorbent assay. Spleen and lung samples were also tested and found positive for the presence of F-gene of PPRV by polymerase chain reaction. Thirteen of 20 serum samples from nearby sheep and goats were found positive for antibodies to PPRV. The disease threatened the huge population of ibex in the wild life park, which was spread over a large area, but vaccination of the domestic population of sheep and goats in the surrounding villages appeared to control the disease.

Keywords Outbreak · Peste des petits ruminants · Mortality · Sindh Ibex · Pakistan

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Introduction

Among domesticated animals, peste des petits ruminants (PPR) is primarily a disease of goats and sheep but is also thought to have played a role in one epizootic in Ethiopia that affected camels and also reported from a domestic buffalo in India in 1995 (Govindarajan et al. 1997). Cattle are usually infected asymptotically and are not known to transmit the disease to other animals. No clinical signs were reported in experimentally infected pigs, which also appear to be dead-end hosts. Peste des petits ruminants can affect some wild ungulates, but there is very limited information on species susceptibility and the occurrence of disease. It was thought to have caused an outbreak that affected both gazelles and deer in Saudi Arabia in the 1980s (Abu-Elzein et al. 2004). The following is a description of an outbreak and investigation of PPR that caused mortality in Sindh Ibex in Sindh province, Pakistan.

Materials and methods

Initial outbreak

The National Kir Thar Park is situated about 90 km away from the superhighway in District Jamshoro and is controlled by Wildlife Department, Government of Sindh. It has a wide range of wild animals including ibex, deer (Cervidae), and markhor (*Capra falconeri*), and there were an estimated 15,000 ibex in the park when mortalities were first seen in July 2009. The Wildlife Department requested the Department of Animal Husbandry, Sindh to investigate the mortalities in ibex, and because the clinical signs and symptoms were suggestive of PPR in domestic small

ruminants, appropriate samples were collected from diseased animals for confirmation of this disease.

Sample collection

Tissue and swab samples were collected for antigen detection, and serum was taken for the detection of antibodies against PPRV. Twenty blood samples for serum from nearby domestic sheep and goats were also collected. Comprehensive information was collected from local persons/farmers about the onset and course of disease in the area.

Laboratory confirmation

The immunocapture enzyme-linked immunosorbent assay (ELISA; Libeau et al. 1994) and the competitive ELISA (Anderson and McKay 1994), both supplied by Biological Diagnostic Supplies Ltd., were used for the detection of PPR viral antigen and serum antibodies to PPRV, respectively. Organ samples were tested for the presence of PPRV nucleic acid using F-gene primers of PPRV by polymerase chain reaction (PCR; Forsyth and Barrett 1995).

Results and discussion

Epidemiological information of exposed area

There was a history of two to three daily deaths of ibex during 1 week period. Overall around 36 deaths (both young and adult) were recorded during 1 month. It was observed that the domestic sheep and goats of the near villages come into contact with these wild animals when grazing and at common water sources. There was also a history of a particular herd of goats having recently introduced the disease to a village near the Park and the subsequent onset of disease symptoms in ibex. Afterward, this herd was moved away from the park. The disease in ibex initially showed itself as sporadic dead animals followed later by both dead and diseased animals near the water sources in the area.

Clinical signs and laboratory confirmation

Both per-acute and acute forms of the disease were seen, with animals surviving from just a few hours to a week after the onset of the disease. The observed clinical signs were fever, lassitude, diarrhea, and anorexia. Death mainly occurred due to arrest of respiration. One affected 10- to 11-month-old female ibex was captured and examined for clinical signs (Figs. 1 and 2).

It had a temperature above 103°F, mucopurulent nasal discharge that was crusting over and around nostrils, ocular



Fig. 1 Female ibex showing clinical signs: ocular and nasal discharges and emaciation

discharge, cheesy material deposited on the gums, severe diarrhea, and emaciation. Treatment was given but this could not be cured. At a postmortem examination of another dead ibex, the major changes seen were discoloration and hemorrhagic patches on the lung, a swollen spleen, and a friable liver.

Samples of spleen and lung were positive for the F-gene of PPRV by PCR. Four sheep and nine goats, sampled in the surrounding villages, had antibodies to PPRV without any previous history of vaccination. Vaccinating the



Fig. 2 Caseous material on gums and mouth lesions

domestic population of sheep and goats and disinfection of the common water sources in the villages surrounding the park resulted in the control of disease.

Acknowledgments We acknowledge the efforts of Wildlife Department, Sindh; Department of Animal Husbandry, Sindh; and Central Veterinary Diagnostic Laboratory, Tandojam, Sindh for the cooperation in the sampling process.

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